BREAK-IN

March/April 2011

The Official Journal of the
New Zealand Association of Radio Transmitters (Inc.)

Dedicated to

Amateur Radio and Electronics

in New Zealand since 1928

Upper Hutt welcomes you to NZART Conference 2011

In this issue:

- Amateur use of Time Domain Reflectometry
- Full-bridge connected LM386 ICs
- NZART Elections results
- Radio in the NZ Post Office; Pt 3
- Workshop Hints and Kinks
- Results of Break-In readership survey
- Cape Reinga mini VHF microwave DXpedition
- NZART AGM agenda, Annual Reports and Remits
- NZART Conference information and registration form

COM-CENTRE (CE) Ltd

YAESU, DIAMOND, AoR, MFJ, Bhi, TET,

NZ's LARGEST DISTRIBUTOR of AMATEUR RADIO EQUIPMENT for over 20 YEARS

Yaesu's Latest Prestige HF Stations FT2000 > and FT450 >

H/V/UHF Rigs:
< FT857/897 &
817 Backpacker

FT897D
H/V/UHF

Mobile - Base V/UHF FM Transceivers

FT1802 Latest VHF FM Deluxe Mobile
FT7800 Extended Cov V/UHF Mob/Base
FT8800 Deluxe V/UHF True Twin Bander
FT8900 Deluxe Quad-Bander 10M-70cm

Wide Band Hand-Helds & Scanners

VX6 & VX7 Deluxe WideBand Handies
VX2R Deluxe Wide-Band Micro H'Held
FT60R Mil-Spec Ext cov V/UHF
VX170 Extended coverage VHF Hand-Held
VX177 Extended coverage UHF Hand-Held
VR500 Multi-Mode Wideband Receiver
VR120D Economical V/UHF Scanner

For all your Amateur Radio equipment:
Power Supplies, Antennas, Tuners, Rotators Dig Sig processing, Wide band Comms Receivers, filters, batteries, speakers, microphones, dummy loads, SWR metering, Coax and cabling + our service centre for all Amateur Radio Equipment.

DIAMOND'S PROVEN, POPULAR and PREFERRED ANTENNAS & ACCESSORIES

X50, X300, X510M Fibre-glass encapsulated co-linear arrays for V/UHF Base Station antennas c/w mounting hardware **from $200**
SGM 911 Tri-Band mobile Deluxe Slim-line mobile for 6,2 & 70 transceivers (also perfect on 75MHz for Scanners) **only $199**
NR-770/790 - Ground independent ½λ on VHF, multiple ⅝λ on 70cm with SO239 base for optimum mobile performance **from $66**
SRH 701/771 SMA FLEXI-Whips specifically for Broad-band freq coverage and gain on Hand-Helds or Scanners **from $49**
RH205 / RH799 Telescopic Whips for DX coverage with Scanners or wide coverage Hand-Helds, BNC mounts **from $60**
DP-CP22L VHF Base Vertical Omni-Directional for VHF Dxing, 2 x ⅝λ co-linear , 2.7M long, over 6.5dB gain on 2M **only $123**
DP-CP6 6 Band HF Vertical 4.6M long, preferred limited space array including radials (1.8ML) 80 - 6M coverage **$1226**
W735 Wire Dipole Kit 80/40M trapped dipole, 26M long includes all traps, balun, wire elements, insulators and ties **only $260**
W80-10 Dipole Kit covers 80,40,20,15,10M under 20M long includes all traps, balun, wire elements, insulators and ties **only $420**
D130 Discone covers 25-1300MHz 1.7M long includes all mounting hardware and 15M low loss coax cabling **only $360**
KV5 ***NEW PRODUCT*** **Latest High Gain Trapped Vertical Array for 80-10M - only 5.8M long, simplest installation** **only $970**
BB6W Wire Dipole equivalent of BB7V complete coverage 2-30MHz only 7M long incls all wire, balun, insulators **only $640**
BB2M ***NEW PRODUCT*** **BroadBand 2-30MHz Specialist MOBILE ANTENNA—no tuning across all HF Bands and more** **$720**
WD330S 10M Long BroadBand T2FD for full 2-30MHz coverage, complete kit incl Balun, Spreaders, insulators etc only $345
WD330 Full 25M Terminated Folded Dipole kit (as above) $590 **Also** ***ZL'S OWN TRIDENT 80-10M*** **HF Mobile Antenna $295**

DIAMOND RELIABLE HD 230v POWER SUPPLIES

GSS3000 35A Linear PS unit V & I meters $495
GSS4000 40A compact, Lightweight, switch-mode PS unit with V & I Metering $ 475.00

Bhi DSP LATEST NES10-3 $443.

As all reviews published suggest, this unit warrants being singled-out for special note. Its ability to virtually eliminate all noise on HF, makes rag-chewing pleasurable and Dxing a breeze The NES10-3, is a must - even if your existing rig has "built-in" DSP, a vast improvement will be heard.

Diamond Professional SWR Meters

SX200 HF/VHF $245 **SX20 HF/VHF $250**
SX400 VHF/UHF $300 **SX40 V/UHF $260**

MFJ's ANTENNA TUNERS & STATION ACCESSORIES

MFJ993B Fully Auto,Totally versatile **$765**
MFJ 971 New, deluxe 200W Tuner **$358**
MFJ 948 Deluxe all HF Versa-tuner **$469**
MFJ904H Fully featured Mini-tuner **$322**
Plus other models to suit specific needs

AoR Professional Receivers & Scanning Monitors

AR8200 Top of the range handheld scanner **$1732**
AR5000 Ultimate all-mode 140k-2.6GHz **$ 5657**
AR8600 Economical full coverage desktop **$ 2335**
SR2000 NEW Rx with Spectrum Analyser **$6770**

+ so much more: As ZL's largest supplier of Amateur radio equipment we maintain good stock levels of all those extra items that enable you to enjoy operating your Amateur station. **Antennas** all bands, base, mobile, portable or Hheld whips **Batteries** Spare Yaesu Nicads, NiMH or LiIon cells **Coax & Cabling** Low-loss 50Ω coax cable RG8 and RG58 **Duplexers** from Diamond & MFJ for H/V/UHF operation **Filters** Narrow CW and SSB opt filters for Yaesu rigs **Flexi-whips** Large range of wide-band ants for H'Helds **Headsets** Comfortable headphones c/w boom mics **Mounts** Magnetic, mobile and pole mounts **Pre-Owned** Great selection of pre-loved equipment **TET-Emtron YAGIS & BEAMS** for HF Dxing

COM-CENTRE 400 Hillsborough Road AUCKLAND
Ph (09)627-0084 P O Box 163-086 Lynfield
Email: comcent@radioinfo.co.nz Website: www.comcentre.co.nz
South Island Distributor - *Seekers Radio Comms* 335 Lincoln Rd Ch'ch
Ph (03) 379-1919 Email: Seekers@radioinfo.co.nz

BREAK-IN

Volume **84**
Number **2**
March/April 2011

*The term **break-in** refers to a system in CW whereby the transmitting station can hear the other station's signal during "key up" periods.*

ISSN 0006–9523

OFFICIAL JOURNAL OF THE NEW ZEALAND ASSOCIATION OF RADIO TRANSMITTERS INC.

EDITOR
John Walker ZL3IB
Phone: (03) 348-9084
Email: <editor@nzart.org.nz>

ASSISTANT EDITORS
Grahame Fraser ZL3SJ
Kelvin Barnsdale ZL3KB
(Technical and Illustrations)

ADVERTISING MANAGER
Lorne Douglas ZL2AHB
Phone: (03) 358-9100
E-mail: <advertmanager@nzart.org.nz>
for — Advertising
— Hamads

EDITORIAL ADDRESS:
EDITOR
BREAK-IN
PO BOX 1733
CHRISTCHURCH 8140
for — Articles for publication
for — Letters to Editor

CALL-BOOK EDITOR
Lorne Douglas ZL2AHB
Phone: (03) 358-9100
E-mail: <callbook@nzart.org.nz>

Preferred electronic format is as Word.doc, *.rtf or *.txt files. Graphics and pictures should NOT be embedded in the text but supplied as separate *.jpg or *.tif files with a list of captions. Hard copy should be typed double-spaced.

CLOSING DATE FOR COPY
10th of preceding month

The opinions expressed in this publication, including advertisements, are entirely those of the authors and do not necessarily reflect official NZART policy.

Typesetting and printing by ***Wyatt & Wilson Print Ltd,*** Christchurch, New Zealand.

Faulty or missing copy of Break-In
Please return faulty copy to, or contact, the Business Manager, NZART HQ, Upper Hutt who will supply a replacement. The Editor cannot supply replacement copies.

NZART SUBSCRIPTION 2010/2011

Annual Subscription:	$95.00
Student Subscription:	$40.00
Family Additional:	$30.00
Maximum Family:	$125.00
Overseas surface mail (No GST):	$95.00
Overseas airmail (No GST):	$110.00

Concessionary and spread payment applications will be considered confidentially upon application to the Business Manager.

Break-In Single Copy	(member) $5.00
	(non-member) $7.50
Call Book	(member) $17.00
	(non-member) $23.00

All subscription and publication prices are GST inclusive.

Contents

Technical

4 Amateur use of Time Domain Reflectometry, revisited
Greg Smith ZL3IX

6 Full-bridge connection of LM386 ICs
Gary Henderson ZL2TBH

7 Workshop Hints and Kinks

Cover photograph: Bronze sculpture of the logo of Upper Hutt, the fantail, at the north and south ends of the Upper Hutt CBD.
Photo by Simon Eatough ZL2BRG.

General

3 NZART Elections 2011; results

6 Radio in the NZ Post Office; Part 3
Reg Motion ZL2LX

8 Results of *Break-In* readership survey; Jan/Feb 2011

9 How I passed my amateur radio theory examination
Aidan Barnsdale ZL3APB

10 Cape Reinga mini-VHF microwave DXpedition 2011
Stephen Hayman ZL1TPH

18 NZART AGM agenda, Annual Reports and Remits

34 NZART Conference information and registration form

? ZL Crossword No.11 (answers p 52)
Graeme Hunt ZL1ANH

Regular Features

45 AREC
47 Around the Branches
44 Awards
40 BI 50 Years Ago
44 Contests
12 Digital Modes
15 DX Downunder
2 From the Editor
3 From the President
52 Hamads
40 IARU
51 Ionospheric Predictions
41 Letters to Editor
48 Longer Wavelengths
36 Morseman
14 New members
49 Old Timers Club
39 Satellite Orbits
38 Silent Keys
16 SPAM
42 VHF Scene
50 WARO

PAST ISSUES OF *BREAK-IN*
Indexes for past volumes of *Break-In* from 1949 to the present are available on the NZART website: <http://www.nzart.org.nz/breakin/index/index.html>

NZART HEADQUARTERS
Business Manager: Debby Morgan ZL2TDM
Suite 9, 19–21 Main Street, Upper Hutt
Office hours: Tuesday – Friday 9am – 4.30pm
Postal Address: PO Box 40-525 Upper Hutt 5140

Telephone: (04) 939-2189
Fax: (04) 939-2190
Email: <nzart.hq@clear.net.nz>
Web: <http://www.nzart.org.nz/nzart> or http://www.nzart.org.nz

COPYRIGHT
***Break-In** is copyright © NZART Inc. Content may not be reproduced without prior consent except by any bona-fide amateur radio organisation which may reproduce them unaltered provided that the copyright of the author and **Break-In** are acknowledged.*
*All material submitted to **Break-In** is subject to editorial review for length, clarity, style, punctuation, grammar, legality and good taste.*

NZART Council 2010–2011

President:
Roy Symon ZL2KH

Vice-President:
Vaughan Henderson ZL1TGC

Council—Northern District:
Tony Case ZL1UD
Vaughan Henderson ZL1TGC
Phil King ZL1PK

Council—Central District:
John Andrews ZL2HD
Max Wheatley ZL2MAX
Fred Johnson ZL2AMJ

Council—Midlands District:
Topsy Scott (Letitia) ZL2LS
Ann Fraser ZL3TNT

Council—Southern District:
John Lochhead ZL4QS

NZART Officers 2010–2011

Business Manager:
Debby Morgan ZL2TDM

Treasurer:
Evan Sayer

NZART Solicitor:
Position Vacant

Administration Liaison Officers:
Don Wallace ZL2TLL

AREC National Director:
Jeff Sayer ZL3EX/ZL4JS

AREC National Secretary:
Doug Cooke ZL1TTE

Awards Manager:
Alan Chapman ZL3GX

Break-In Editor:
John Walker ZL3IB

Call-Book Editor:
Lorne Douglas ZL2AHB

Contest Manager:
Frank Hunt ZL2BR

EMC Officer:
Brian Emmett ZL3BE

Examination Co-ordinator (Morse and Theory):
Debby Morgan ZL2TDM

FMTAG — Chairman:
David Andrews ZL2SX

FMTAG — Secretary:
Doug Ingham ZL2TAR

InfoLine Editor:
Jamie Pye ZL2NN

Local Government Liaison Officer:
Mike Newman ZL1BNB

Monitoring Service Co-ordinator:
John Martin ZL1GWE

National Training Officer:
Warren Harris ZL2AJ

Official Broadcast:
Jim Meachen ZL2BHF

IARU Overseas Liaison Officer:
John Lochhead ZL4QS

QSL Manager:
Barry Stewart ZL2RR

Reciprocal Licence Bureau:
Joe Reed ZL2AH

World Wide Web:
Jamie Pye ZL2NN

From The Editor

John Walker ZL3IB
<editor@nzart.org.nz>

I guess that the recent Christchurch earthquake is still at the forefront of many member's minds. Sheila and I were fortunate that our 50 year old wooden house is in one of the safer areas of the city and it withstood the shakes with only minor damage. We lost some glassware and a few vases but no major structural damage. However when I dared to go to my semi-basement shack/workshop I was confronted by a heap of assorted components etc on the floor and many of my collection of vintage communication receivers piled up on the carpet. I was lucky not to have been in the shack at that time. You may see some Christchurch "quake pictures" elsewhere in this issue.

The earthquake has also caused some problems for our printers whose premises are located in Heathcote close to the fault-line. However Vanessa Tansey, our trusty typesetter, is working from her home for now and the printers have just advised that they expect to be back up and operational in the very near future.

The local seismic events have also affected our processing of the results of the recent *Break-In* readership survey. However I can say that we have received over 195 replies and there appeared to be an overall level of satisfaction with *Break-In* in its present content and format; I was pleased that there were many favourable comments on the overall quality and content of the magazine. Nonetheless it was disappointing for us to learn how few respondents had actually contributed anything to *Break-In*. Several readers offered suggestions for new columns and more articles on topics such as simple constructional projects for beginners, Hams in their Shacks, reviews, etc. We have already tried to run these sorts of features over the past few years but they have petered out because of lack of input. No lack of ideas but a large shortage of contributors!

Finally I would draw your attention to the NZART AGM and Conference information in this issue. This is your opportunity to make some input into the future of amateur radio in New Zealand and NZART.

John Walker ZL3IB, Editor

New Zealand Association of Radio Transmitters INC

(Founder Member of the International Amateur Radio Union Region 3)

Mail to: BUSINESS MANAGER, PO BOX 40-525, UPPER HUTT 5140, NEW ZEALAND

PLEASE ENROL ME AS A NEW MEMBER AS FOLLOWS:

TRANSMITTING ☐ NON-TRANSMITTING ☐ STUDENT ☐ FAMILY ☐ OVERSEAS ☐ ASSOCIATE ☐ CONCESSIONARY ☐

MR / MS / MRS / MISS	INITIALS	SURNAME
ADDRESS		
OCCUPATION		DATE OF BIRTH

CALL-SIGN	
PREFERRED BRANCH, NAME or NO	
PLEASE FIND ENCLOSED	$
MY SUBSCRIPTION TO	Dec 31 2011
I agree to abide by the NZART Constitution	Signature:

The information requested (other than date of birth) is for membership records required to be maintained under the Incorporated Societies' Act 1908. Date of Birth is requested for statistical purposes only.

Membership benefits include the automatic inclusion of transmitting call-sign holders' address details in Call Book (published annually).

If you DO NOT wish your details published please sign below:

I DO NOT want my address details published by NZART _____

IF YOU PREFER TO PAY BY CREDIT CARD PLEASE COMPLETE

EXPIRY DATE ☐☐☐☐

MASTER CARD ☐ VISA ☐

CARD No. ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Signature:

From The President

Roy Symon ZL2KH
<zl2kh@xtra.co.nz>

The destructive earthquake that jolted Christchurch on Tuesday 22 February was something that the folk down there did not need. My sympathy, thoughts, and prayers are extended to all amateurs affected and to all citizens of that fine city. I have also received messages of concern and offers of help from the Radio Society of Great Britain, the American Radio Relay League, the Irish Radio Transmitters Society, the South African Radio Relay League, and the Wireless Institute of Australia. There are amateurs from all over the world who are concerned for your welfare.

Council held a face-to-face meeting on 19 February. A report on this meeting has been circulated in HQ Infoline. Please read the report. If you do not subscribe to HQ Infoline I recommend that you do so. It is a very valuable source of information. Go to the NZART web page <www.nzart.org.nz> and follow the links.

As I write this, NZART elections for President and the Northern District councillors are being conducted. By the time you read this the results should be known and you will have chosen those who will run things for the next two years. It is concerning that there were three out of the four districts where no elections are necessary. Those south of the Waitaki River should be canvassing members to see if there are any volunteers to fill the vacancy resulting from there being no nominations. It gives a candidate a sense of being wanted when they are elected by a majority vote; and not just given the job because they were the only one to put their hand up. It doesn't bode well for the future health of NZART if only nine nominees for council can be obtained from over fifteen hundred members.

Next year there will be an IARU R3 meeting in Ho Chi Minh City as well as WRC-12 in Geneva. Both of these will be expensive and members should be considering how these can be funded without either raising the subscription or dipping into reserves. These meetings are important because it is at them that our frequencies are decided. Without frequencies we don't have a hobby.

Roy Symon, ZL2KH
President, NZART (Inc)

NZART 2011 Election Results

President

John Andrews ZL2HD	185 Votes
Simon Lewis ZL4PLM	159 Votes
Roy Symon ZL2KH	293 Votes

Roy Symon is by the above result duly elected President

Northern Region Councillors

Vaughan Henderson ZL1TGC	253 Votes
Neill Ellis ZL1TAJ	138 Votes
Phil King ZL1PK	231 Votes
Stephen Hayman ZL1TPH	143 Votes

Vaughan Henderson, Phil King & Stephen Hayman are duly elected

Central Region Councillors – No Election Required
Fred Johnson ZL2AMJ
John Andrews ZL2HD
Warren Harris ZL2AJ

Midlands – No Election Required
Ann Fraser ZL3TNT
Simon Lewis ZL4PLM

Southern Region – No Nominations received.

Incoming Council to nominate a Representative Councillor
Scrutineers for this election were Peter Norden – ZL2SJ and Mrs Joanna Gunderson from Parsons Roddick & Co, the Association's Auditors.

Evan T Sayer, Returning Officer, 21 March 2011

Next deadline for copy is
10 May 2011

NZART Radio Science Education Trust

Application for Grant-in-Aid

Applications are invited from secondary school science teachers and other training providers for Grants-in-Aid from the NZART Radioscience Education Trust to promote the development of projects in the general areas of radio and/or electronics. It is anticipated that these projects will lead to entries in the local area Science and Technology Fair. Grants will not normally exceed $250.00

Applications should normally be received no later than 30th April of the year of application. Application forms may be obtained from:

The Trustees, NZART Radioscience Education Trust, PO Box 1733, Christchurch 8140, or from <trustee@nzart.org.nz>. Applications should be endorsed by the Head of Science or, for other organisations, the President/Chairperson.

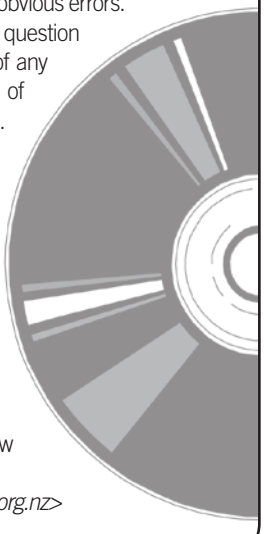
NZART examination training dvd

The series of 15 DVDs have been completed and are available via NZART HQ. This series is very much an individual's (mine!) interpretation of how to present the material. I have kept the scripting fairly informal in order to maintain the material similar to how I would teach a class in person. I have checked the material and hopefully there are no obvious errors. The level of material is at, or a little above, the question bank for the exam. In order to teach material of any kind you do need to go a little above the level of the examination at times for clarity of explanation. The introduction on DVD1 covers this.

The technical quality is quite acceptable although some of the earlier material is a little low in video resolution but still adequate; this was due to the learning curve in the process of going from digital tape to DVD.

Any suggestions/constructive criticisms are welcome, please email me. I would like to acknowledge the invaluable assistance given by Grant Simpson ZL2BK in the technical production and Jim Meachen ZL2BHF in cleaning up a few rogue soundtracks.

Stuart Watchman ZL2TW <zl2tw@nzart.org.nz>



Amateur use of Time Domain Reflectometry, revisited

By Greg Smith ZL3IX

Introduction

Time domain reflectometers (TDR) have been around for a long time, probably at least half a century, and maybe more. I even built one when I was a student, back in the early 70's. They are also mentioned in amateur radio literature, and one is included in the ARRL Antenna Book*, in the section on Antenna and Transmission Line Measurements. (Ref 1). I have the feeling though, that we radio amateurs are not making as much use of them as we might.*

A few days ago my HF antenna installation developed a strange intermittent fault, and I didn't know where it was. Luckily my mind went back to that TDR lashup I made as a student, and I wondered whether I could use a similar one to help me locate the problem.

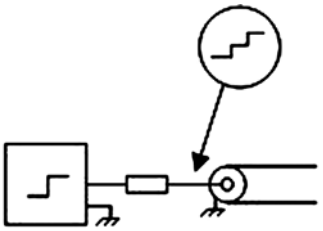


Figure 1. Basic TDR arrangement.

TDR Principle of operation

A TDR is just a pulse generator with a defined output impedance, and an oscilloscope to monitor its output. The pulse generator is connected to the transmission line that feeds the antenna system as in Figure 1.

If the transmission line is terminated in a load equal to its characteristic impedance, the oscilloscope shows a replica of the pulse, with an amplitude of half the open circuit pulse voltage (Figure 2).

Figure 2. Return from matched line.

If the transmission line is terminated in an open circuit, the oscilloscope will show a waveform with a positive-going step in it, as shown in Figure 3.

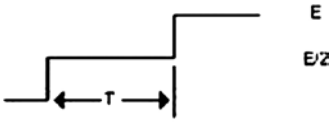


Figure 3. Return from open line.

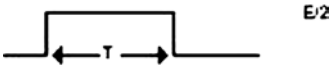


Figure 4. Return from shorted line.

What happens here, is that the pulse travels along the transmission line until it reaches the open circuit, and is then reflected back in phase with the incident pulse. When the reflected pulse reaches the source again, its voltage adds to the voltage produced by the pulse generator, thus producing the step. The time T is the time that the pulse takes to travel from the source to the open circuit and then back again. It is equal to:

$$2D/(c.V_f)$$

Where D is the length of the cable, c is the speed of light, and V_f is the velocity factor of the cable.

An alternative way to see this, is that the pulse generator initially doesn't "know" that the transmission line is unterminated, so it sees a load equal to the characteristic impedance. Only when the reflected wave arrives back, does it find out that there is an open circuit at the far end.

If the transmission line is terminated in a short circuit, the wave is reflected back out of phase. (This has to be the case, as the incident and reflected waves must cancel at the far end, since a voltage cannot exist across a perfect short circuit.) The step that appears after time T, is then negative-going, as shown in Figure 4.

Diagnosis at ZL3IX

My antenna feed arrangement is shown in Figure 5. The coax from the shack is foam heliax, and runs down the garden to the base of the tower and there is a joint at the mid point. It then runs up the mast to a diplexer which is used to separate out the 432 MHz signals that I use to control my remote receiving array. From the diplexer there is a short run of RG213 (about 2m) which takes the HF signal to the relay box. The relay switches between a direct feed to my 3-element SteppIR Yagi, or a matching network for my 160m top-driven vertical. The cable from the relay box to the Yagi is also RG213, and about 4m long.

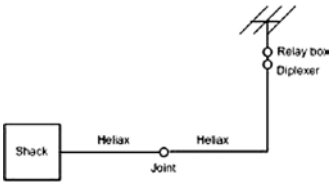


Figure 5. Antenna feed arrangement at ZL3IX.

When I connected my hastily constructed TDR to the antenna feed in the shack, the scope trace was displayed as shown in Figure 6. In this, and all the scope records, the upper trace is the trigger, and the lower trace is the voltage across the transmission line. Note the slight bump at about 625 ns after the trigger. Since the load was supposed to be the HF Yagi, this little bump was suspicious. At this time I had not calibrated the system when operating correctly, so I had no reference against which to check the timing, and had to take the manufacturer's specification for the velocity factor. Assuming a factor of 0.88, the distance from the generator to the fault, is 82.5m.

I was therefore able to deduce that the problem was at the top of the mast, rather than somewhere in the heliax run. I did not have enough information, without a prior calibration, to tell whether the diplexer, relay box, or the Yagi itself, was at fault. First of all, I suspected the relay box, as relays have moving parts, and can therefore have reliability issues.

Having reluctantly lowered the mast, I took the relay box apart, but could not find any problem. I then disconnected the relay box, and replaced it with a dummy load. I found to my surprise, that the bump at 625ns, was still there. I therefore moved back a bit, to inspect the diplexer. I found to my embarrassment, that one of the type N connectors seemed to be a bit loose. I undid it and retightened it, and the bump went away. Bingo!

I then closed up the relay box, re-attached it to the top of the mast, and took some more traces, for future reference.

Figure 7 shows the TDR return when the SteppIR™ Yagi is selected by the relay. Note the peak at 700ns. The broad peak is produced by the combination of the Yagi itself, and the balun. At all but its resonant frequency, the Yagi appears like a series tuned circuit, and presents a high impedance. The droop in the response is caused by the magnetising reactance of the balun. After a time, the current flowing in the balun, builds up, causing the reac-

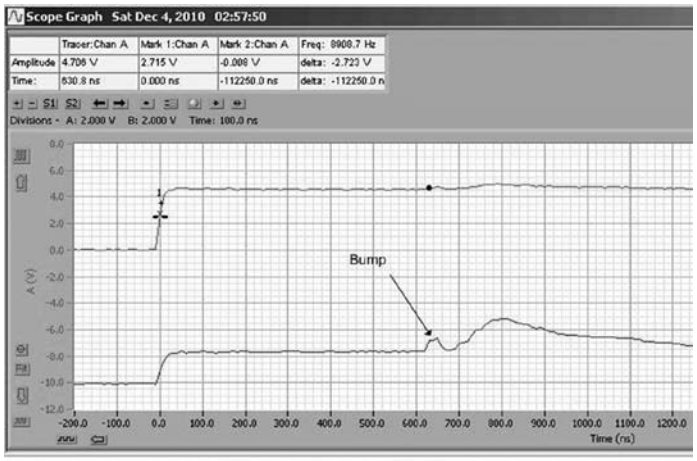


Figure 6. Return from faulty system.

tance to appear to drop. Remember that increasing time corresponds to decreasing frequency, and the balun has a low magnetising reactance at low frequencies.

Note also the tiny glitch at 650ns. This is caused by a slight mismatch in the relay box, and can be seen more clearly in the next picture.

Figure 8 shows the return when the 160m antenna is selected by the relay. The first component that the waves sees happens to be a shunt capacitor of just over 1 nF. This capacitor looks like a low impedance to the fast rising edge of the pulse, and causes the trace to show a short downwards dip. Note the position, at 650 ns. Had I done this calibration while the system was operating correctly, I would have known immediately, that the fault was around the diplexer, and not in the relay box. Compare again the traces taken with the fault still present (glitch at 625 ns) and correct operation (glitch at 650 ns for 160m or 700 ns for HF).

Going back to the TDR return for the Yagi (Figure 7), the tiny glitch at 650 ns is caused by a very slight mismatch in the relay box. The relays I use are quite large vacuum units, and it is impossible to keep their leads as short as I would like. The mismatch is quite small in SWR terms, but is visible in the TDR trace.

Note that, in order to resolve timing differences as small as 25 ns, the rise time of the driving pulse must be as short as possible,

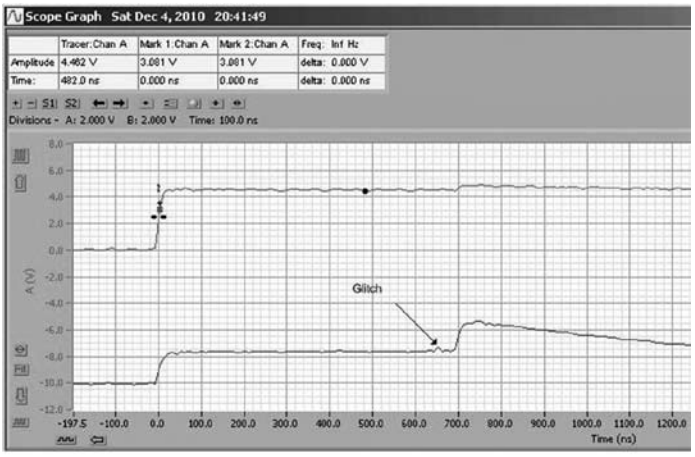


Figure 7. Trace from HF Yagi operating correctly.

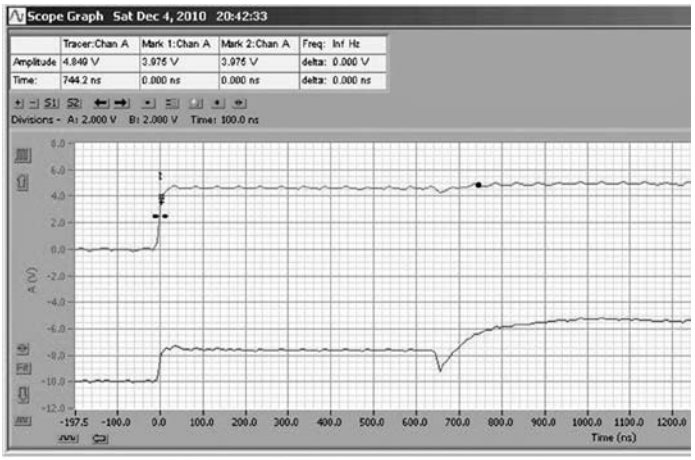


Figure 8. Trace from 160m antenna operating correctly.

and the oscilloscope must have a reasonable bandwidth. Mine is capable of 100 MHz. Obtaining a fast pulse is discussed in the next section.

The cable between the diplexer and the relay box is about 2.5m of RG213. With its advertised velocity factor of 0.67, one would indeed expect the difference in glitch timing to be around 25ns.

TDR circuit design

The schematic of the circuit that I built, is shown in Figure 9. The pulse generator is the same as in the circuit in the *ARRL Antenna Book,* and uses a 555 timer, running at about 70 kHz. The pulse is sharpened up and buffered by the 74AC00 gates. I particularly chose Advanced CMOS for the gates, as this logic family has rise and fall times of a couple of ns, and can easily drive a 50 ohm load. The actual gate type is not critical, and could also be AND, OR or NOR. The *ARRL* circuit uses a transistor driver, but the rise time is only claimed to be around 15 ns, and I suspect that I would not have been able to resolve the 25 ns difference between the returns from the diplexer and relay box, with this slower rise time.

C2 to C4 provide broad band AC coupling, to avoid the DC current of 50 mA that would result from DC coupling the unit to a 50 ohm load.

U3 is just a 5V regulator to provide the supply for the 555 and the gate pack.

I use one of the gate outputs as a trigger for the oscilloscope, as the waveform at this point is largely unaffected by the reflections from the line.

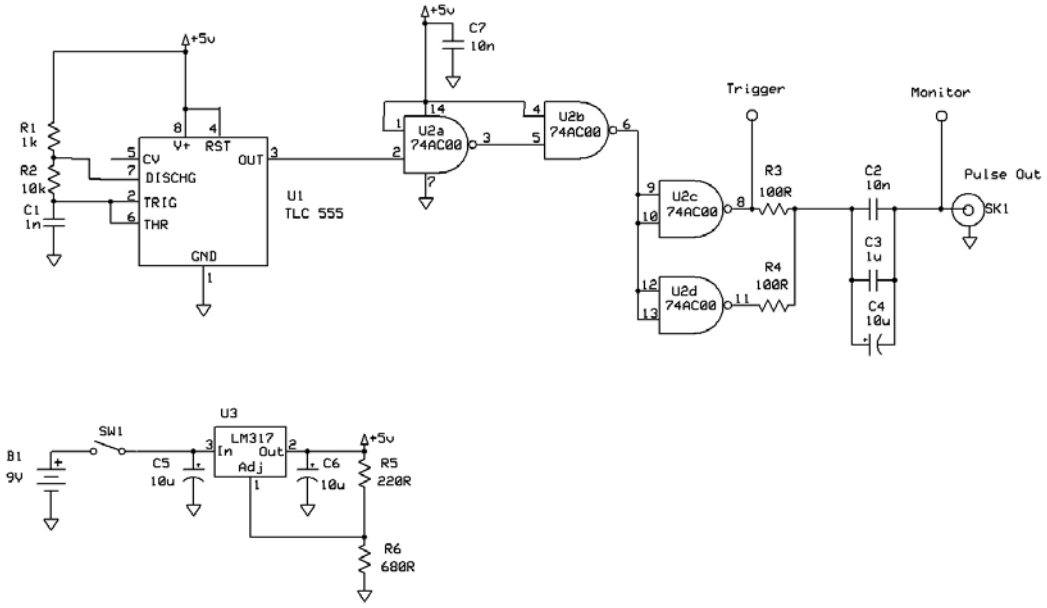


Figure 9. Reflectometer schematic.

Conclusion

The TDR is a very simple tool to build, and, combined with an oscilloscope, can be a very useful tool when trying to diagnose antenna feed problems. For it to be really useful, you must build and calibrate it while your system is working correctly (which I did not do). Build one up, try it out, and see if you can analyse the cause of all the bumps and glitches that you see. βi

References

The *ARRL Antenna Book,* various editions, Section 27.

REMEMBER:

Leave a three second pause between overs when using repeaters.

Someone else may have an urgent message.

Full-bridge connection of LM386 ICs

by Gary Henderson ZL2TBH

The low audio-output IC LM386 is very suitable for use to drive the speaker or headphones of a QRP rig, provided a little care is taken to manage its generous bandwidth. This IC offers quite low idling-current as needed for battery-operated gear. However, quite a few of the better-quality small speakers that we may come across may be ex-telephone applications, so will have quite a high impedance. (I have some intended for door-phone applications; their Mylar cones make these ideal for portable rigs.) When using these with the typical 6V supply of the Alivo and similar rigs, the resulting output power is just too little to be really useful.

The answer is to use two LM386 ICs in "Bridge-tied load" (BTL) configuration. This provides double the output-voltage swing; if presented with the lowest permissible load for the version of LM386 used results in double the power but also requires double the load-impedance. For a case where the available speaker is already 16 ohms or more, the load is safe anyway so the output-power will be four times as great as from a single device.

Full-bridge (BTL) operation simply requires that the positive input of one IC is tied to the negative input of the other and vice versa, with input applied to one of these tied pairs and the other grounded. The load can then be connected directly between the two output terminals, without the need for a coupling-capacitor. This means that the resulting assembly can be smaller than for a single IC, especially if SMD ICs are used.

The LM386 has an automatic biasing arrangement, to set the output DC to half of the supply voltage, more or less independent of the input common-mode voltage. Care is needed to avoid input bias-current offsets from shifting this working-point; the DC resistance from the positive and negative inputs to common must be kept equal. With a single IC using an output-capacitor, this is non-critical but with the BTL setup, the influence of unequal DC negative-return resistances will drive the respective outputs in opposite directions. This wastes battery-current and may reduce loudspeaker performance, but can be kept to insignificant levels by ensuring that the respective positive and negative input DC-return paths are all of equal resistance; this is most simply achieved by capacitive coupling with nothing shunting the internal approx 250K input resistances of the ICs. A final trim for offset could be applied by judicious addition of a high-value shunt resistor to one of the "grounded" inputs, if they are individually capacitively-coupled.

I found that even a single LM386 was almost impossible to stabilise when built into a plug-in type prototyping panel, but gave little trouble when the identical circuit was built on matrix-board. (I used a piece of Jaycar HP-9558 board.)

The resulting assembly works well; well under 1% THD at onset of clipping, with the output-voltage practically unaffected between no-load and full-load.

In principle, there is a case for adjusting the drive to the "inverting" – connected IC to equal that of the "non-inverting" one. (Used without any external gain-setting, the non-inverting side has a voltage-gain of 20 but the inverting side will inevitably have a gain of one less ie 19). This would give the greatest non-clipped output but with a low-powered output I think it better to accept slightly earlier but softer clipping as occurs with the simpler setup.

Bob ZL2ASO has reported that the usual methods of increasing the gain of the LM386 work quite happily with this configuration; Google "LM386" for links to data-sheet and other users. (Beware; some of the forum contributions are from users with little understanding of audio-output stages!), The easiest of these methods is to add a 10 µF capacitor between pins 1 and 8 of each IC, ie two capacitors for the BTL circuit. This increases the gain each side to 200.

The capacitors marked with brackets on the schematic are not essential when the gain per side is left at the standard value of 20 (or 19 inverting), but are essential for stability at higher gains and also help keep RF out. βi

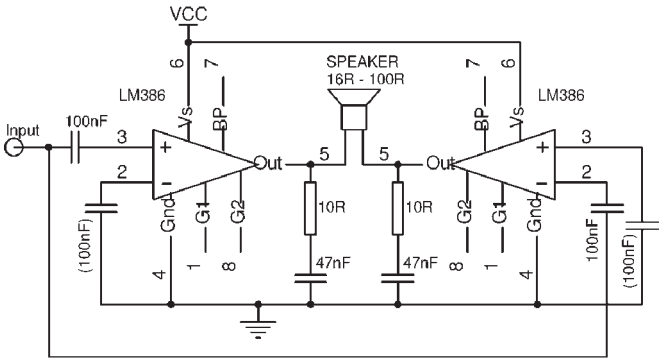


Figure 1 Two LM386 ICs in "Bridge-tied load" configuration.

Radio in the NZ Post Office; Part 3

by Reg Motion ZL2LX

Following this quartz crystal development work it became evident that a replacement was needed for the ageing General Radio Frequency Standard then installed at Makara and a review was made of all the equipment then used for this purpose throughout the world. Eventually it was decided to develop our own using full digital readout to 32 MHz if possible. This development resulted in a frequency measuring console of a unique design which served as the New Zealand standard for many years when installed at Makara Radio. An illustrated description of this console was published in *Break-In* March/April 2006.

Following this period on devel-

Fred Ashton setting a mounted crystal in the evaporating chamber.

Workshop Hints & Kinks

Cheap and easy PCB holders

When assembling circuits on PC boards, or trying to service them, I often feel the need for a simple holding device with non-conducting clamps. The simple jigs shown in Photo ?? were assembled from plastic or wooden clothes pegs and small pieces of MDF board. I think the photos are self-explanatory.

These simple holders have also proved to be very useful when trying to solder wires to coaxial plugs, headphone jacks etc.

John Walker ZL3IB

Another simple but sturdy PCB holder

This printed circuit board holder was designed for use of participants in the ZL3 Buildathons held in Christchurch earlier this year. The dimensions are not critical as long all the holes required for the screws and nails line up. The photos (2a, 2b, 2c) are self-explanatory.

Construction will be much easier if a drill press is available as the holes for the nails and machine screws need to be correctly aligned. Clamp the pieces of wood together where holes are to be drilled through more than one piece to ensure accurate alignment.

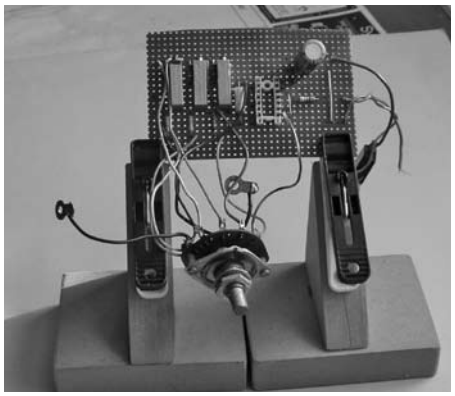
Materials required:

- 2 x pieces of 18mm by 18mm pine; 180mm long
- 1 x piece of 20mm by 45 mm pine; 140mm, long
- 1 x piece of 10mm custom board; 100mm x 200mm
- 2 x 50mm steel nails
- 2 x 55mm x 4mm machine screws, 2 nuts, 2 washers and 2 wing nuts to fit.
- 2 x 15 mm counter sunk wood screws

To use simply clamp the PCB between the wooden strips and place on the base so as to hold the PCB vertically or horizontally depending on assembly requirements.

Doug Pratt ZL2BCF

John ZL3IB's "el-cheapo" PC board holders.



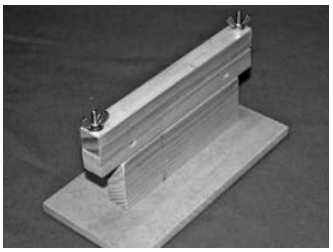
The Buildathon PCB holder components.

The Buildathon PCB holder in use.

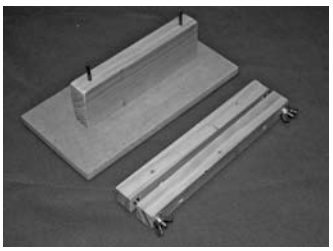
opment I was transferred about 1955 to a group dealing with the procurement and installation of radio bearer equipment for Toll Telephone traffic within New Zealand. Most of the intercity traffic had traditionally been carried by physical overhead lines, either using one line for each circuit or by Frequency Division Multiplexing (FDM) where a number of speech circuits channels were frequency shifted to higher frequencies thus providing a composite signal which could be transferred as a whole over one physical line and demodulated at the receiving end; virtually wired wireless. Only specially constructed lines could carry more than a few channel of FDM without noise and crosstalk and these were costly. As mentioned earlier we had successfully experimented with VHF radio to carry FDM traffic across Cook Strait but as intercity traffic burgeoned worldwide overseas suppliers started manufacturing suitable bearer equipment and we purchased our supplies from them. Starting with modest 5 channel bearers from GEC we progressed to 48 channel VHF bearers from Marconi (UK) then in 1960 to a 600 channel microwave bearer from STC in UK. All this equipment used valves which demanded large standby power supplies and had the frequent need for attention to keep them working. The work of finding suitable sites for such hilltop stations, acquiring equipment and supervising the installations kept our group busy. I, and others, spent a great deal of our time away from our base in Wellington on such work. Around 1964 we purchased microwave equipment which was largely transistorised and this cleared up some of the supply and reliability problems.

By 1964 I had qualified as a professional telecommunications engineer and was transferred to administrative positions thus ending my direct involvement in "hands-on" work . The scope of work in Radio Section expanded to include development of overseas communication by satellite means and of cellular radio telephony systems. Telecom then took over and radically changed the modus operandi but by that time I had retired so I have to leave it to others to cover this period of development.

Much of this article was originally published in the New Zealand Vintage Radio Bulletin and the ready agreement of the NZVRS Society to its publication here is acknowledged.



Above and below: ZL4PN's soldering iron tip cleaner.



Soldering iron cleaner.

Soldering iron cleaner

A honey pottle, a cable tie and bit of rag make this simple device to clean the tip of a hot soldering iron. Put an inch of water in the pottle, and the rag over the rim will always be wet and ready to wipe the iron on. Works a treat; I have been using one of these for a long time.

73, *Brian ZL4PN*

(It is to be hoped that the above ideas will lead to a regular column for the exchange of workshop-related "Hints & Kinks". John ZL3IB, Editor)

Next deadline for copy is **10 May**

Results of Break-In Readership Survey; Jan/Feb 2011

This questionnaire was developed by the Break-In *Editorial team, with the expert assistance of David Searle ZL3DWS, to seek information from readers as to their views on their current and future needs from the magazine; also their thoughts on future directions for* Break-In. *We need our reader's input to help us plan for the future by telling us what you want from your magazine. A big* ***"thank you"*** *to all those (over 195) who took the trouble to reply. All replies are confidential and anonymous; (which means that I cannot identify and reply to those who included short letters and notes. Perhaps they could contact me directly. Ed).*

NB. Results are expressed as a percentage of total replies received (over 195).

Section 1. Personal profile of members

1.1 *Age group*
Under 35 [1], 35- 44 [5], 45-54 [9], 55- 64 [29], Over 65 [55].

1.2 *Occupation. Are you involved professionally in any of the following employment areas?*
communications [19], computing [13], education [7], radio and electrical work [19], Retired [18],

1.3 *Formal qualifications;*
Secondary [15], Tertiary (eg Polytech or University [43], Trade [29].

1.4 *Major hobbies and interests in addition to Amateur Radio:*
cars and motoring [27], computing [35], crafts and model making [3], DIY [9], music and Hi-Fi [9], Other; a wide range of activities from outdoor pursuits, to philately and photography.

1.5 *Grade of licence;* All respondents held General Licences.

Section 2. You as a Radio Amateur

2.1 *On average, how many hours per week do you spend on amateur radio activities?*
less than 5 [35], 5-10 [39], more than 10 [23].

2.2 *Which aspects of amateur radio occupy most of your time?*
Antennas [49], AREC [9], Administration and/or Committee work for Branch or NZART [5], Awards [9], Contests [3], Construction and home-brewing [14], DXing [9], Satellites [4], Ragchewing [7]

2.3 *What are your favourite amateur radio bands and modes?*

	CW	SSB	AM	FM	Digital modes,	ATV & SSTV	QRP	Satel-lite	Portable/ Mobile
HF 10 -160m	33	56	8	4	9				7
VHF & UHF	3	19		47	4	2	2	6	17

2.4 *Are you an active member of:*
AREC [26], Civil Defence [18].

2.5 *Approximately how much of your equipment is home-built (include kit-sets)?*
0-25% [72], 25-50% [15], 50-75% [3], 75-100% [3]

2.6 *Do you attempt to service your own equipment?* Yes [90], No [10].
Seems that we all like to "have a go"?

2.7 *Approximately how much have you spent on amateur radio equipment over the past three years?*
Less than $500 [30], $500-1500 [33], $1500 –3000 [20], Over $3000 [10].

2.8 *During the past three years have you purchased any amateur radio equipment as a result of advertising in* Break-In *or via TradeMe®?*
Commercial advts [25], HAMADS[31], TradeMe® [35],
No purchases [32].
Clearly TradeMe® is becoming a major source of sales of ham gear.

Section 3. You as a reader of Break-In

This section was an attempt to ascertain reader's views on the content of *Break-In* to help us to make *Break-In* and *Call-Book* more suited to members' needs.

a) In 2011 *Break-In* (including *Call-Book*) is expected to cost you about 45- 50% of your subscription. Is the current relative cost too much? Yes [18], No [80].
b) or do you want the present size and quality maintained even if it means a subscription increase in the future? Yes [74], No [27].
c) Would you like to have *Break-In* printed in colour; even if it meant an increase in subscription? Yes [26], No [74].

Most members seemed satisfied with the status quo and many included complimentary comments about the magazine. A small minority would like to see a return to eleven issues but did not comment on the thorny questions of extra cost or supply of copy material!

3.1 *What do our readers read regularly in* Break-In?

AREC [54]	Around the Branches [67]
Awards [37]	Contests [37]
Digital modes [53]	DX World [51]
Feature articles [84]	FMTAG [39]
From the Editor [84]	From the President [74]
General interest articles [89]	HAMADS [84]
Historical articles [74]	IARU [30]
Ionospheric Predictions [40]	Letters to editor [83]
LF scene [49]	Magazine survey [47]
Monitoring Service [47]	Morseman [63]
New members [62]	OTC [40]
QSL Bureau [41]	Reviews [66]
Satellite News [43]	Silent Keys [71]
SPAM [52]	Technical articles [85]
VHF Scene [60]	WARO [25]

Several respondents said that they "read *Break-In* from cover to cover".
Which are your favourite regular features in Break-In?
The most popular columns/features were: Morseman, Technical articles, HAMADs, Digital modes, DX World, VHF Scene, Historical articles and SPAM.

3.3 *Regarding technical content only, do you think that articles in* Break-In *are: -* Too technical [10], About right [80], Not technical enough [9]

3.4 *How do you rate* Break-In *for presentation, clarity and readability?*
Excellent [45], Good [45], Satisfactory [5], Poor [1].

3.5 *Which other amateur radio/electronics/computing magazines do you read regularly?*
QST was the most widely read; other popular magazines included *Amateur Radio, RadCom, CQ, QEX,* and *Silicon Chip.*

How I passed my Amateur Radio Theory Examination

by Aidan Barnsdale ZL3APB

When my brother got his license, I decided I wanted to do mine, so I asked my dad if I could start revising, and before I knew it I was doing one exam practice a week.

With practice, I started getting over the fifty mark, and I began to do one a day. After a few more over the fifty mark, the big day came when I sat down and did the exam that I had been practicing for the whole year. I was wondering what mark I would get for the whole time I was sitting it. When I had finished the exam I got 52 questions right, a lot more than I expected. I am no longer "ZL3not yet"; I am now ZL3APB.

My dad (ZL3KB) gave me an Icom IC-02, and I used it to get my first 10 contacts in two days with local hams on the Christchurch 147.050 repeater.

On the day of earthquake two in February, my brother Liam (ZL3LB), and I, had arranged to have a contact on the 147.050 MHz repeater at school interval, but I was busy. However, when the earthquake struck we used our radios to make sure each other was OK, but we had to keep it short because the repeater was being used for emergency purposes.

So I found that ham radio is very useful, and I recommend it to anyone who is reading this and has not got his or her license yet.

This is the beginning of my ham career. 73's to everyone who has read this. βi

Aidan Barnsdale ZL3ABP (age 12)

Aidan ZL3ABP (left) with his friend and "ham to be" Oliver (right).

SUPPORT OUR ADVERTISERS THEY SUPPORT BREAK-IN

3.6 *What is your opinion of* Break-In *as a radio/electronics magazine?*
Excellent [35], Good [40], Satisfactory [21].
Comment: The above results should be considered in conjunction with Q 3.1; ie. how does the percentage of regular readers compare with space allocation.
Undoubtedly there is strong readership demand and support (over 30%) for more constructional articles and projects, more technical articles and reviews of new equipment and software. More feature and general articles would also be welcomed.
So, now we know what our readers want; the problem remains of sourcing this additional material? It's over to you dear readers; get writing, share your ideas with other readers, tell us about any projects that you have built. As editor I look forward to receiving lots of new articles!

3.7 *How many times have you accessed the NZART web page in the past two months?* About 3.6% of respondents had accessed the NZART web pages between 1 to 5 times during the past two months, whilst 17% had accessed more than 8 to 10+ times.

3.8 *If* Break-In *was offered in printed and electronic format (pdf) which would you choose?*
Printed [74], Electronic (pdf) [29], Both [35].

3.9 *Do you buy any extra copies of the NZART Call-Book?*
Only 7% said 'yes'

General comments

Collating and analysing the results of this survey has taken a lot of time but has been a worthwhile exercise and gives the *Break-In* team some useful guide lines for the future. Many of the suggestions for improvements in *Break-In* (like cheaper paper, etc) have been considered and discussed in earlier editorials so will not be repeated here. Printing is a very competitive trade and *Break-In* regularly checks on best pricing options.

Having *Break-In* and *Call-Book* available on the NZART web page was another suggestion, but this could be counter productive by lessening further the benefits of membership; if anyone can access them, why pay to be a member of NZART? Similar criteria apply to offering current issues of *Break-In* in pdf format; how do you control/prevent copying and distribution to non-members?

Finally I should like to thank all those members who took time to respond to this survey and who offered helpful and supportive comments; they are much appreciated. Many of the suggested topics and columns have been attempted over the past year but, sadly, have not continued because of lack of further contributions. We can only print more constructional articles, more reviews, more "ham profiles, etc, etc, if we receive the articles, large or small. I say again "it is now up to you, the members, to send *Break-In* the necessary material".

John Walker ZL3IB and the editorial team

Lucky Prize Draw

The $100 Lucky Prize voucher was won by Member No. 103605, Mr D R Glover ZL1BGB of Pakuranga. Congratulations from NZART.

Cape Reinga mini VHF microwave DXpedition 2011

by Stephen Hayman, ZL1TPH

To support the VK9NA VHF and microwave DXpedition to Norfolk Island from 9-19 January 2011, we drove to the top of New Zealand and operated portable out of a vehicle for the same two week period. Two sites were chosen because of easy road access and panoramic, elevated, views across the ocean towards VK9NA. One portable QTH was at Ahipara on the west coast and commonly known in New Zealand as the 'Gum Fields'; a high 200 m plateau located at RF64NT and 838 km distance to Norfolk Island. The other site was at Cape Reinga (RF65IN) at the top of New Zealand, and at 748 km was closer to Norfolk Island and at 175 m ASL.

Our prime focus was the microwave bands from 23 cm to 3 cm with 144 MHz as liaison. Our VHF station was 250 Watts to an 8 element horizontal Yagi on 2 m. For the microwave bands a 1.25 m diameter Andrew dish with 150 W on 23 cm, 100 W on 12 cm, 20 W on 9 cm, 100 W on 6 cm and 5 W only on the 3cm amateur band. For a number of days I was assisted on site by both Simon ZL1SWW and Harry ZL1BK; many thanks.

It became evident over the first week and a half, with the many excursions to our two portable sites in the far north, that VK9NA was easily worked or heard at either 838 km or 748 km distance with their fine 2 m station at around S2, but the conditions only provided marginal propagation on the 23 cm band. However a personal best distance was achieved with VK9NA on 1296 MHz SSB / Digi at 838 km from the Gum Fields on 13 January NZT. They were received at best -12 with the JT65C digital mode.

Watching the Hepburn charts as the days went by, we saw what could be an intense inversion layer appearing on Sunday 16 January UTC at around 1800 or thereafter, with red on the Hepburn indicative of "Very Intense Propagation" between Cape Reinga (RF65IN) up to Norfolk Island (RG30XW) at 748 km.

At this time tropical cyclone Zelia was coming down from the tropics in a southerly direction towards both Norfolk Island and New Zealand. Cyclones that come down from the tropics actually diminish in general or become weaker. A high at the same time had moved across the top of New Zealand and was heading westerly away past Cape Reinga. It was decided by prior emails to VK9NA that we make an attempt at 1900 UTC on the morning of 16 January 2011 (8am Monday 17 NZT).

Driving north from my motel accommodation in Kaitaia at 6:30 am in the morning, it was raining and wet and dismal. Arriving at Cape Reinga 1.5 hours later at 8am, it was surprisingly dry underfoot but in the clouds and mist and the humidity was extremely high with no visibility whatsoever. Initial contact on 2 m was not that strong at only S2 at 748 km distance.

We both decided to set up our respective 1.25 m dishes at each end, and then tested on 13 cm (2.4 GHz) with no success. A call was made for more accurate dish alignment at my end, because with no visibility, I had lost my accurate ridge line bearing at 200 metre distance away, which points to Norfolk Island. We dropped down to 23 cm and I locked my dish on the VK9NA signal.

With tests again on 12 cm, their beeper identification was easily heard, resulting in a weak SSB contact on 2.4 GHz (2403.1 MHz) with headphones on at 10 am NZT. Digital JT65c was then attempted, but the frequency instability at my station resulted in no decode. We moved to the digital mode FSK441 as an attempt to complete a digital QSO on 12 cm which was achieved. Signals at this point were becoming stronger on my receiver and VK9NA asked for an additional piece of unknown information sent to me on 2.4 GHz, received was "RECORD 73 RECORD 73 RECORD 73 RECORD" on my PC.

At around 10 am ZL time or 2100 UTC our liaison frequency on the 2 m band surprisingly went up to S9+. At one point, operator Alan VK3XPD reduced power from 400 W to 35 W on 2 m and was still S9 with no QSB. It turned out we now had a three to four hour intense temperature inversion.

We now moved up to the 5.76 GHz band. The initial received signal from VK9NA was not strong but was easily heard at my station at around 11:30. VK9NA could not hear my return transmission on 6 cm. Alan VK3XPD made an excellent call and asked, "If you can hear us OK, how about going outside and check your dish alignment." I swung the dish only a few degrees to the north and VK9NA were now 57 and extremely loud on 5.76 GHz. We completed on SSB to VK9NA, to operator Kevin VK4UH.

With our 5.76 GHz stations, both were locked either to a GPS 10 MHz reference or a 10 MHz TCXO for frequency stability, we now tested JT65C. Best decode was -5 with callsign exchange along with an additional piece of information sent as an extra requirement from VK9NA, with the words "RECORD STEVE" received at -14.

Once that was complete we attempted a contact on 10 GHz or the 3cm band. No signals were heard each way, but at the time the TWTA from VK9NA was not fully operational.

A call was then made to move back down the bands and test on 3.4 GHz or the 9cm band at 1pm NZT. The VK9NA signal was easily heard on this band also, resulting with a fine SSB contact to station operator, Kevin VK4UH once again. Signal reports from Norfolk Island on this band ranged from 51 to 59 at around 1pm NZT on SSB.

ZL1TPH portable chasing VK9NA in Norfolk Island.

5.76 GHz dish setup towards VK9NA.

Portable Cape Reinga working VK9NA on 3.4 GHz.

We attempted JT65C on 9cm but it was soon evident that my 9cm transverter was not stable enough for this transmission mode. The line coming down the screen was clear but all over the place. We then changed to FSK441, but shortly afterwards the band started to close. VK9NA was now gone on 9cm at around 1:30pm NZT, both ways to our surprise, and so no digital contact resulted.

We checked the 2m band at around 2pm NZT. The 2m band was down to S2 and the intense opening looked to be over. We tested 10 GHz again with VK9NA now having fixed their 100 W TWTA power amplifier, but nothing was heard on 10 GHz from VK9NA or from my station to VK9NA. The intense opening to VK9NA, we believe, only lasted for around three hours that day, from 10am to around 2 pm NZT on 17 January 2011. We both packed up our stations and I left Cape Reinga at 3pm NZT for another 1.5 hour drive back to the Kaitaia motel.

The high anticyclone, moving westerly away, across the upper north island of New Zealand, along with tropical cyclone Zelia moving down towards ZL and Norfolk Island we believe created a small and narrow intense inversion layer or duct. The inversion layer itself, which was clearly evident on the Hepburn charts, along with excellent propagation, coincided with an area between two low pressure systems of 970 hPa and 991 hPa. This area will be unstable moist air sinking and spreading out with very high humidity in excess of 90 percent.

Mentioned on the radio, one of the VK9NA operators said that "the mist was moving in" on their operating site at Norfolk Island. The VK9NA were operating at only 50 m above sea level and the Cape Reinga beam heading towards ZL was through Norfolk pines located nearby.

Monday 17 January 2011, from the VK9NA website was reported, "The sked with ZL1TPH confirmed that conditions were good enough to try a contact on 2.4 GHz. Later contact was made with ZL1TPH on 2.4, 3.4 and 5.7 GHz and we think there were some records broken by those contacts. Later in the day the weather forecast was that a cyclone would pass over the island overnight. In preparation for that all antennas were dismantled. The storm "missed us by a whisker" and plans are to reassemble the 2m / 70cm + station on Mt Pitt if possible and to raise the EME antenna again in time for some EME activity later in the afternoon and evening".

The station operators, with the VK9NA DXpedition to Norfolk Island were; Alan VK3XPD, Kevin VK4UH, Michael VK3KH and Andrew VK1DA. New Zealand amateur's radio operators would like to thank the VK9NA team for activating Norfolk Island once again in January 2011.

Other internal ZL VHF and microwave contacts were achieved from the top of New Zealand with this trip to the far north in 2011. Ted ZL2IP was worked on 5.76 GHz SSB at 551 km towards Mount Taranaki to set a new distance internal record. On 2 m or 144 MHz David ZL4DK at Knights Point, was worked on 2m at 1074km distance with 4/1 5/1 exchanged with unknown information before hand, along with no internet access. While operating from Cape Reinga, on one of the many excursions, Bob ZL2ASO from Wellington stopped by and introduced himself. It was great to meet Bob. βi

Other Christchurch quake news

Christchurch West Amateur Radio Club Inc Br56 suffered some minor cracks in its block walls from the September quake but fortunately no further serious damage from the latest shakes.

The September quake shook Malcolm Gordon ZL3UU's shack with gear falling to the floor. By contrast John Walker ZL3IB's semi-basement shack and workshop was quite shaken by the March quake with boxes and boxes of components etc ending up in an untidy heap on the floor. More serious, many of John's collection of vintage communication receivers also fell of their shelves but fortunately appeared to have suffered little external damage; however they still await testing.

From Kelvin Barnsdale ZL3KB. After the quake, our section was flooded, including our garage. A WS48 set had fallen off a shelf 2m above ground, face down into the water, mud and liquefaction. When I eventually found it hours later, the meter was half full of grey water, and it looked like a front-loader washing machine. This was at a time that many other emergency household tasks were top priority, but there was nothing more important than my rare WS48 meter! I quickly unscrewed the meter, but the water refused to drain until I had disassembled the case completely. After a day in the airing cupboard, the meter movement swung like a new one, and all was saved. When we get water back on, I will give the set a good wash. We can't have army sets looking muddy!

More earthquake images on inside back cover.

WELLINGTON RADIO EXPO 2011

WELLINGTON EXPO-11

The Wellington Region **EXPO-11** is to be held on
Easter Saturday 23rd April 2011
in conjunction with the **VHF Convention**
At the Tawa College Gymnasium,
Duncan St, Tawa

Admission to the EXPO is $4. Each ticket includes a free drink and entry into the various raffle draws. Listen out for the raffle draws throughout the day by MC ZL2BHF.

There will be trade displays, trade sales of new amateur equipment and of course trading tables of used equipment as well as a display of military radio equipment.

Times: Opens at 10am (Vendors 7am). Closes at 1pm

Refreshments; coffee, soft drinks, buns & cakes will be available.

All inquiries for table sales and bookings to:
Gavin Cross ZL2TVM Email: <zl2hv@nzart.org.nz>

Digital Modes

Murray Greenman ZL1BPU
<zl1bpu@nzart.org.nz>

More on MEPTs

Of *course* you know what a MEPT is … Manned Experimental Propagation Transmitter, right? We Amateurs are not, of course, permitted to operate beacons (unmanned automatic transmitters) without special licences, but there are many opportunities where a prearranged and coordinated test transmission can be very useful. Examples are signals to allow antenna measurements, to provide a source for weak signal reception adjustments and improvements, or for propagation measurement. Now that the ionosphere is *finally* starting to wake up, these MEPTs, which operate worldwide, will really prove their worth for propagation studies.

While to be in compliance with our licence conditions the equipment needs to be manned, ie. monitored and controlled, it can be automated in order to include ID, make operation simpler, and to allow for more complex and hence more useful transmission formats. Most of the time very low power is more than sufficient for the task. This is the world of the MEPT!

I run two MEPTs from time to time. The HF one is on whenever I'm home, usually on 10.139 MHz, and although it runs only 100mW to a 6m whip antenna, is copied frequently on the other side of the world (Figure 1 is from IK1WVQ[1]. The other, which I mentioned briefly in the last column, runs 15 W on 508 kHz, with an EIRP of about 10 mW. They differ considerably in the way they work.

The HF MEPT operates like a conventional digital mode setup. It uses an SSB exciter, and the carrier is generated as an audio tone on an old laptop computer. As I believe I've explained before, the message it sends is a WAV file, and the WAV player I use (ZL2AFP's VMEPT Tool) has a built-in timer and PTT control, so the message is transmitted exactly every ten minutes, with a duration of about four minutes. Reference [2] provides the software and explains how the program is used.

In contrast, the MF MEPT has a homebrew carrier and modulation generator, using Direct Digital Synthesis based on a micro. It will operate from DC to 550 kHz, and uses a 'script' stored in internal memory to transmit the required ASK and FSK pattern[3]. This drives a CMOS chip buffer, which in turn drives a pair of cheap power FETs in a Class D push-pull arrangement. The transmitter is very efficient, and the whole arrangement runs off 12V with a battery for backup. It's frequently copied in Australia at night on 508.0 kHz.

There are many MEPTs in operation world-wide[4]. While there are plenty on 30m, and more than a few on 600m (several in Australia), they are also found on most other bands. 40m and 10m are popular at present. Most MEPTs are much simpler than mine, consisting of a small micro-keyer, controlling a simple crystal controlled transmitter. This approach uses a lot less overall power, something to keep in mind these days, and quite a few of these are now also solar powered.

Making a MEPT out of spare parts

My HF MEPT is essentially just a collection of used equipment. See Figure 4. The system is mounted in an old 19in rack. At the very top of the photo is the homebrew remote controller. The six knobs on the left set the frequency (1.6 to 30 MHz in 100 Hz steps), using a diode matrix. The next knob selects the mode (AM/MCW/CW/USB/FSK) while the knob on the right sets the RF gain. There are a couple of switches for carrier on/off and local/remote operation, and a TX ON LED. Connection to the Exciter is via a multi-way parallel cable.

Below the remote controller sits the old laptop PC that runs the show. It's a 233 MHz Toshiba 300CDS, with Windows 98™, not much memory and no battery, but has a working serial port and sound

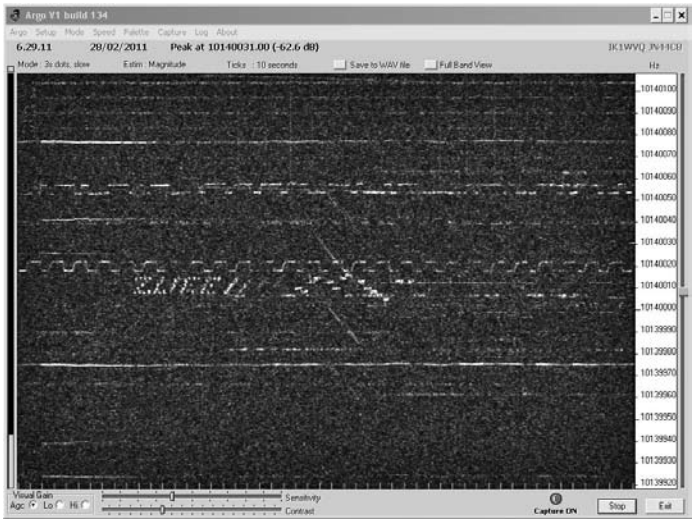


Figure 1. Reception of my 30m MEPT in Italy.

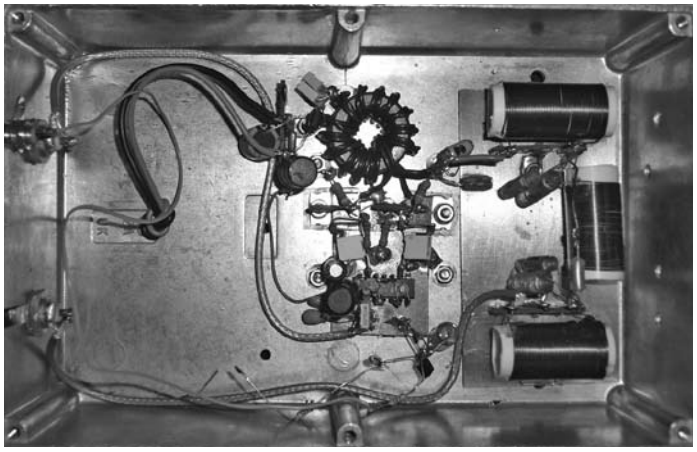


Figure 2. The 600m MEPT 15W transmitter.

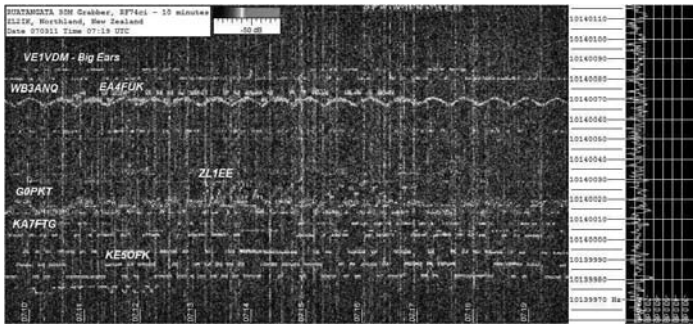


Figure 3. MEPTs received from around the world on 30m.

card. It sits on the Exciter, so I can access the laptop easily by sliding the Exciter out on its rails.

The Exciter is a beautiful JRC NMA-73D unit, previously the heart of a 5 kW Airways Corp airport transmitter. It is very easy to set up and use. The main reference is a very stable 1 MHz OCXO which controls all frequency generation. The Exciter has an LED frequency display and both local and remote control.

Below the Exciter is a large box, which was part of some other equipment. While it looks impressive, all it does is act as a box to hold the power supplies and the laptop AC adaptor. Finally, at the bottom is the power amplifier. This is an ex-Navy broadband amplifier, using a pair of 2N3553s and good for 1W output. However, the gain is low, and combined with the low level Exciter drive gives only 100 mW, but nothing runs the slightest bit warm.

The backup power supply and its battery are in the bottom of the rack, not visible in the picture. The UPS has been recycled from a computer system, but with an old car battery replacing the dead internal battery. The audio and PTT

circuits (within the remote controller), and the antenna tuner, which is on the other side of the garage, are also out of the picture.

While the system is hardly small, and not terribly efficient (35 W mains input for 100 mW out!), the MEPT is convenient, highly adaptable and very reliable. I operate it with an L-match tuner and 6m whip antenna with multiple ground radials. The system will operate all bands from 80m to 10m.

A major advantage of the SSB exciter type MEPT is that you can easily transmit complex and effective patterns and also time them very accurately, an important factor when image stacking is considered. It would be really great if we could combine the low power and simplicity of the micro-controlled MEPT with the capability of the WAV file. There are some interesting equipment possibilities that we may soon see operating as MEPT controllers.

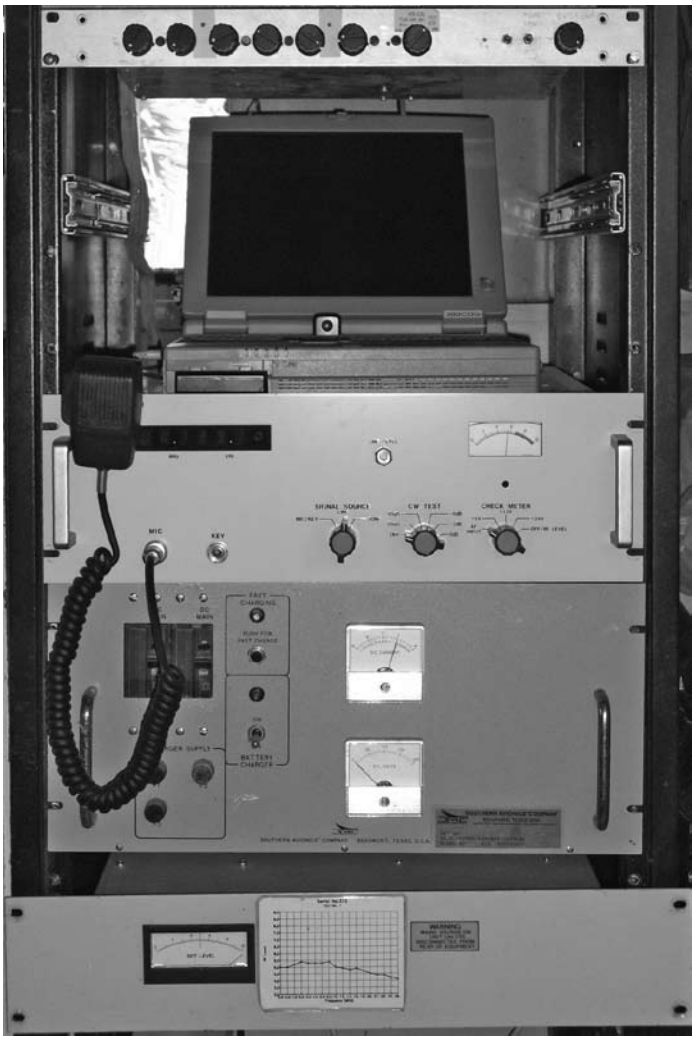


Figure 4. My rack-mount HF MEPT system.

Recycled computer parts

You may not realise it, but the ADSL modems we use for internet connection almost all operate with an embedded LINUX operating system. Some of them have quite well publicised means of adaptation, and even the source code is available. This of course means that once they've outlived their intended use, they make great little controllers for other things, such as MEPT controllers. The ones of most interest can be 'flashed' with an operating system called Open WRT, for which there is quite a library of working applications. Some are now in use locally as packet radio controllers with internet forwarding.

Andrew ZL1WJQ has been exploring a similar type of unit, the network attached storage controller or NAS, for use as a MEPT controller. The unit he has is a LINK-SYS NSLU2[5] which has a USB2 port in addition to the network port. He has been able to add a media player (plays MP3 files) and set up an SNTP client (keeps time accurately via the internet), and has it operating so that it sends the sound file on an exact schedule; just what you need for MEPT! PTT control should be straightforward, and the plan there is to share the USB port with a conventional USB serial port device.

Another possibility is the 'thin client' type computer such as the HP T5300. These are small, low powered units, diskless, often running Windows CETM, and used in retail applications. These too are becoming available at affordable prices.

As well as being a low power approach, these types of equipment can come back into action automatically when power is reapplied, and can be accessed via the network so the operator can change the settings or the sound file. I will let you know when we have the prototypes on the air.

Balloons and digi-modes

Two different, but quite interesting examples of digital mode telemetry from balloons have come my way. What is most significant is that both involve the use of one of my favourite digital modes; DominoEX.

One of these ideas, and perhaps the more bizarre, comes from Clayton VK1TKA (who used to be ZL1TKA). He has built and tested the telemetry unit for a solar balloon, and although he's made some balloon flights, more or less successful, and has had the telemetry unit working very well for some time, I've not yet heard of a successful flight with telemetry.

Clayton's unit operates on 3.58 MHz, and uses two crystals. The 3.58 MHz crystal is frequency shifted by the micro, which is able to measure the frequency using a more stable 1 MHz crystal reference. This builds a table of frequencies, which are used to generate the MFSK pattern of the DominoEX message, operating at 4 baud. It works so well that I was able to copy it in Auckland (from Wellington) during the day on 80m, with only 100 mW of transmitter power.

Why is Clayton's idea bizarre, you ask? Well, his balloons are solar heated! Yes, hot air balloons, made of several black rubbish bags connected to make a long tube, and open at the bottom. There's not much lift, so the controller and battery need to be very light. The idea works best when there's no wind and plenty of sunlight.

The other balloon development is quite recent. I've heard from Bill WB8ELK that he has made many successful flights, using high helium altitude balloons and using 16 baud DominoEX transmissions. Here's part of his recent email:

"As some of you are aware, I've been promoting the use of DominoEX for use in high altitude balloons for some time now and have flown at least 30 missions using the mode over the past several years now. It's surprising that it hasn't become as popular as other modes on HF as I'd have to say that with its Incremental Shift decoding that it's the easiest of all MFSK type modes to encode on a microcontroller (I have it operating on a Cypress PSoC) and it has superior performance for everyday QSO's as well. It has been used with the UK website <http://spacenear.us/tracker> with great success as I encode the data with a checksum that if accurate will upload to their server and plots the balloon's position onto a Google Map customised for high altitude ballooning. I also have my transmitting board doing Hellschreiber, ASCII, RTTY, and CW, but DominoEx performs the best of all modes with the ability to copy way down below the noise level."

He goes on to say that the transmitter operates on 40, 30 or 20 m at 1 W or less and gives really good DX. Of course the balloon's altitude helps!

An interesting point that Bill raises is that he finds that some receiving software for DominoEX works better than others, and the finding disagrees with expectations. We've found from experience on HF, from conventional home stations, that FLDIGI and ZL2AFP's original DominoEX software work better than F6CTE's Multi-PSK in DominoEX mode. Bill has found the opposite to be true with bal-

continued on page 14

◂ *continued from page 13*

loons. We think the reason is that F6CTE's implementation does not use fine spaced bins in the FFT detector (should be two or more bins per tone separation); instead he matches the spacing to the tones, and as a consequence needs to use an AFC system to ensure that the tones align with the bins. No AFC is required in the preferred approach, which also permits metrics to be developed in the receiver, which also allow for very effective code puncturing options for operation with Forward Error Correction (eg. the related mode THOR, which uses DominoEX tones and MFSK16-style FEC coding).

The advantage of F6CTE's receiver in this unique application may be that, with AFC, it will handle thermal frequency drift (a serious problem with high altitude balloons) better than the conventional software. Conversely, the conventional software handles multi-path reception better, and especially randomly Doppler shifted signals, which are common with conventional DX but unlikely with balloons.

Bill generates the DominoEX tones by direct FSK, and his tone spacing (unlike Clayton's calibrated tone map approach) is often not perfect. We don't yet know for certain whether this also contributes to the difference in receiver performance, and I've encouraged Bill to run some ionospheric simulator tests in order to find out. I also put him in touch with Clayton for advice on accurate tone spacing.

Bill will be presenting a 'BalloonSat' forum at the Dayton Hamvention this year.

Natural disasters

The fate of Christchurch and the terrible earthquakes are in everybody's mind at present. My own recent minor natural disasters were insignificant in comparison. In the most recent incident I wasn't injured, and the house didn't fall down, but it could well have burned down!

About five minutes after I arrived home from work one day, there was an almighty noise outside, which sounded like a truckload of scrap metal being been dropped in my driveway. The house circuit breakers all popped, and a nasty burning smell permeated the house. Within moments there was a rumble of thunder and it started to pour, so I'm guessing there had been a lightning strike on the power distribution system nearby.

I hurriedly disconnected everything that had been running, and reconnected the breakers, but there was no power, which wasn't restored for several hours. The nearby distribution transformer had been taken out, and I've since heard that there was quite a lot of other damage around the neighbourhood. My own list of things that failed was not small, and has caused me considerable disruption. My microwave oven blew up; the Redifon MF/HF exciter (used for MEPT) has a nasty smell and died; my MF MEPT transmitter died; the main archive hard disc crashed and lost many of my photographs and program source code; the RACAL LF/MF/HF receiver scrambled it's memory and required recalibration; the HP Z3801 GPS reference died because it's power supply/charger blew up and the batteries subsequently died; and I had a power switch in the garage arc over and die.

Quite an impressive list, and it was sobering to consider what might have happened if I'd not been home, or if more equipment had been switched on at the time. Fortunately most of the household equipment was turned off, since it was daytime and I'd just arrived home, so the lights, all the computers and my precious new HDTV survived. Interestingly, the HF MEPT and GPS reference in the garage, running off an old UPS, also survived and continued running. Lesson learned; leave things switched off and preferably unplugged when not in use!

Small bits

Peter G3PLX (you know him; designer of AMTOR, PSK31 and an acknowledged expert on many aspects of digital modes and propagation) reports that he has successfully decoded the data from a new type of digital ionosonde, called the DPS-4D Digisonde[6]. An ionosonde is like a radar system, but operating on HF and designed to detect reflections from the ionosphere in order to map its propagation properties.

The signal Peter has decoded was from a transmitter about 300 km away, but outside ground wave range. The transmitter sends a pair of 16-bit patterns in a pulse 533µs long, and sweeps from 1 MHz up to about 13 MHz.

Peter uses a homebrew software defined receiver which sweeps to track the transmissions and software which decodes the pulse pattern. The transmissions appear to be locked to GPS time, and use a coding system that allows pulse compression. The time resolution achieved is much shorter than the length of the pulse, while at the same time the sensitivity is improved since everything which does not correlate with the pulse code is rejected.

Peter has successfully plotted oblique soundings from the transmission, and has observed single and two hop F reflections as well as Es. He has yet to work out how to suppress responses from short-wave broadcast stations as the receiver scans the spectrum. With at least two receiving stations operating, it should be possible to locate an unknown transmitter site. Like other sounders, this new type transmits right through the ham bands, only breaking briefly for emergency frequencies.

References

[1] <http://qsl.net/ik1wvq>

[2] <http://www.qsl.net/zl1bpu/SOFT/VMEPTtools.htm>

[3] <http://www.qsl.net/zl1bpu/MICRO/EXCITER>

[4] There is a mail group for MEPT-lovers at <http://cnts.be/mailman/listinfo/knightsqrss_cnts.be>

[5] <http://en.wikipedia.org/wiki/NSLU2>

[6] Technical manual available at <http://ulcar.uml.edu/Digisonde4DManual-web.pdf>

New Members

Name	*City/Town*	*Branch*	*Call-sign*
A Barnsdale	Christchurch	5	ZL3APB
J Koch	Russell	84	ZL2ICU
C S Thode	Auckland	2	ZL1CST
Radio Heritage Foundation	Wellington		
M Duncan	Christchurch	5	ZL3MWD
R Pellizzari	Christchurch	5	ZL3ROD
A Mohamed	Auckland	21	ZL1AFG
M F Donovan	Blenheim	22	ZL2AJM
J W A Young	Havelock	22	ZL2JRY
R Raeder	Hokitika	49	ZL3AAA
B C Bellini	New Plymouth	27	ZL3BN

ZL3APBC's shaken shack.

DX Downunder

Graeme Hunt ZL1ANH and ZL1T
<graemeh@xtra.co.nz>

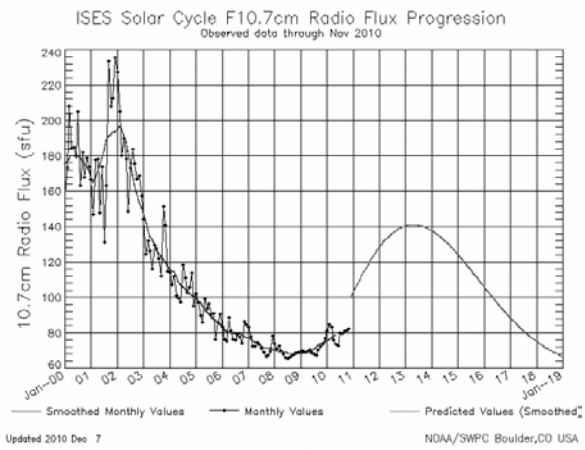
Early 2011 brought several DXpeditions including South Orkney, Sao Tome, Angola and Cameroon. The Africans have been difficult copy; a combination of mediocre propagation, low power and small antennas, and appalling operating behavior by a few who operate on the fringe of normality, and probably live like that too.

For those new to the hobby, DXpeditions are amateurs travelling to countries where there is little or no DX activity to put that entity on the air. They can be anything from an add-on to a family holiday on a tropical island to an almost military operation to inaccessible locations. The family holiday type may just involve taking your radio and a wire antenna to give a few QSOs from the hotel balcony. At the other end of the scale a group will hire their own boat, and even a helicopter, and travel to a remote uninhabited island.

The most recent was the South Orkney operation VP8ORK in the Southern Ocean, south of the Falklands. Shelter, food and water had to be taken along with the radios, antennas, generators and fuel. They landed on the rocky shore by zodiac inflatable. They notched up 63643 QSOs, some for lucky ZLs.

We are very well served by DXpeditioning hams and there are a few ways we can help. Consider giving them a donation via their website or send a little extra when you ask for their QSL. The other way is to keep away from their frequencies if you aren't trying to work them.

Both my own ZL50GH call and Papakura Branch with ZL50VK have been popular. Each of us is celebrating 50 years, myself as an amateur and ZL50VK as a club. Coincidently I was a foundation member of that Branch. Some confusion, however, as we are occasionally spotted as Antarctica with the ZL5 prefix. I enjoyed the Papakura Branch celebrations and dinner in February and caught up with some of ZLs top DXers, ZL1ALZ, ZL1ALE and ZL1AMN. Another highlight was a visit to ZL1AOX's QTH and a look at Kiwisat which he is bench testing prior to launch later this year.



Solar flux.

VP8ORK landing.

If you aren't in the log, blame Pete.

There is a lot of consternation out in DX land about deliberate QRM and several solutions suggested, most of which are unprintable. There is a general consensus that DX clusters make it easier for these idiots, and a suggestion that the cluster software be changed to either only indicate band (as opposed to a frequency), or that the DX station must agree to the spot before it appears, has merit.

Propagation

The solar flux index (SFI) continues to track up, and as at late February shows a significant improvement and has passed 125 for the first time for many years, although it's back to 89 as I write.

From K7RA mid-February: "A dramatic surge in solar activity is underway, with a level of sunspot numbers and solar flux not seen since 2005-2006. A sunspot number of 100 has not been equalled or exceeded since 6 April, 2006 when it was 105." However the graph shows a gradual climb when compared to the height of last cycle 11 years ago. The SFI then was over twice as high and QSOs with Africa on 20 and 15m and 10m was possible with two AA batteries and a piece of wet string for an antenna – well not quite, but you get the idea.

The magic reset

Recently an elderly guy arrived on my doorstep. He had walked 2km in the rain to my house because he had seen my antenna. Turns out he had been a ham for a long time but for several years his transceiver hadn't worked. I drove him home and had a look at it. It was a current model and was fine on VHF/UHF but HF sounded most weird, just birdies every few hertz. Time for the magic reset. All these transceivers have partial and full reset, usually you turn the power on while you hold in a couple of buttons in. Full resets put them back like they just came off the production line and that's just what happened in this case. Now I hear him happily working DX. So if you are having trouble, try the magic full reset. Reset instructions will be in the manual, a caution; any memories and settings you have made will disappear.

I have found that if there is a problem with your radio, it will invariably be something like a wrong button pushed, menu selected or a peripheral like the mike plug that is causing it. It is very rare that the radio is actually broken.

DXpeditions

DX0DX was postponed. The announced activation of Spratley Island did not eventuate. DXpedition leader VK3FY advised that it has been postponed due to circumstances beyond their control. As the ship which they originally chartered was damaged some months before, they arranged for an aircraft instead, but then couldn't get the necessary clearances. All DXers I

continued on page 16

◄ continued from page 16

am sure extend their thanks for the effort and expenses the team went to. It must have been frustrating for the team to assemble in the Philippines, and then have to sit in hotels rooms and wait. Shades of the first attempt to reach 3Y, Peter 1 Island; on that occasion the team chartered and paid for a ship which sailed off into the unknown with their considerable amount of money. These types of occurrence are not all that infrequent and makes me appreciate the sacrifices some make so we can work the rare one.

As an aside, it was interesting to note several "spots" appear on clusters, as people round the world told us what frequency DX0DX was currently on. You can't believe everything you see on the net.

It is possible that another attempt to activate Spratley will be made later this year.

ZD7FT, St Helena. Has a weak but workable long path signal most late afternoons on 20m in Northland. Peter is a permanent resident and a very patient operator.

FH, Mayotte. Bruno, DH1BL for the next three years. Currently active as FH/DH1BL, he expects to get an FH call-sign in the near future.

9N, Nepal. Operators Dov/4Z4DX/9N7DX and XYL Anat/9N7YL will be active between 13-30 April. Activity will be mainly 20/15/10/6 meters using mostly CW, RTTY and PSK31.

5Z, Kenya. Sig NV7E/ZS6SIG, who has relocated from Pretoria, South Africa to Nairobi, Kenya is now signing 5Z4EE for the next four years.

6W, Senegal. Fernando, EA1BT, will be active as 6W/EA1BT between 3-12 May.

D2, Angola. QSL Manager Mike, CT1IUA, informs OPDX that Paulo, D2CQ (aka CT1ITZ), will be back on the air very soon from Porto Amboim. He was off the air for almost one year after some equipment was stolen from his QTH (power supply, coax, PL's, Windom …). Paulo will be on the air with a G3TXQ Hexbeam and for now he will only be active on 20-6m SSB. He plans to put a dipole up for 40m and 80m soon. Mike mentions that sometimes the electricity goes down for two or three hours, so it is normal that Paulo suddenly disappears once in a while!

ZA, Albania. Franck, F4DTO, will once again be active as ZA/homecall from Elbasan between 2-16 April. Activity will be on 40 -10m, mainly SSB, using 100 W and monobander antennas.

P29CW, Papua New Guinea.

T31, Central Kiribati. Update: An international team will activate T31A from Kanton Island (OC-043) between 17-28 April.

Southern Sudan looks like becoming a separate country in July this year.

Others to look out for in April: P4/W1HEO, Aruba; T6PSE, Afghanistan; 7Q7HB, Malawi; H44MS, Guadacanal; 5X1NH, Uganda and D2QR, Angola.

Most wanted countries. A survey late last year revealed the most wanted countries by many DXers. Marion, Crozet, South Orkney and MacQuarie have had recent activity and will be moving down the list. Auckland and Campbell Islands are the only ZLs to make the top 20. They are about 500km south of ZL and I understand that visits are severely restricted by the Dept of Conservation to protect the wildlife. A previous DXpedition was allowed to visit, but only during daylight.

The LOTW and DXCC lists are still showing the old Netherland Antilles detail but should update soon. The problem relates to processing DXCC applications received before the change.

ANZA Net

Daily DX net at 0515z on 14183 kHz.

VOACAP Predictions

Worth a look at <http://www.voacap.com/>. An interactive site in development. Enter your location and antenna and select either point to point, eg Auckland to London, or a world map and it gives you graphs and maps of propagation possibilities based on current SFI (solar flux index).

What's on the air now?

<www.dxsummit.fi/DxSpots.aspx>

Announced operations

<www.ng3k.com/Misc/adxo.html>

QSL information

<www.qrz.com>

Sunspots

<www.solarcycle24.com/>

Acknowledgements

VE3UN, VK3FY, 425 DX News, OPDX Bulletin, DXNL, K7RA, Don N1DG of the VP8ORK team.

Contact me by email at <graemeh@xtra.co.nz>, and I am still needing your biography please!

SPAM – Society For The Preservation Of Amplitude Modulation

Roy Symon ZL2KH
<zl2kh@xtra.co.nz>

Secretary/Treasurer:
Roy Symon, ZL2KH
Mail:
25 Annandale St,
New Plymouth 4310
Phone:
06-758-2156
E-mail:
<zl2kh@xtra.co.nz>
Librarian:
John Nicholson, ZL1AUB
E-mail:
<j.nicholson@clear.net.nz>
Nets:
3.850 MHz (AM) Friday nights at 2000 hr local time.

This month there are descriptions of some pieces of radio equipment used in World War II. In order to keep things fair, I have included gear from both sides of the conflict. There is a ZC1 Mk1 set-up described by George ZL2GM and also a German receiver described by John ZL3IB.

New members

There are two new members to welcome this month. They are:

- 309, ZL1AYH / VK3DOP, Allen Wallace, Rotorua
- 310, ZL2TAG, Alan Bennett, Gore

I have yet to work either of them on AM but am looking forward to doing so.

Silent Keys

There is one Silent Key to farewell. She is:

- 45, ZL2RT, Jenny Spackman, Ngaruawahia.

My wife and I attended Jenny's funeral in Hamilton and there was a good turnout of amateurs present to support Tom ZL1WW.

Annual General Meeting

The Annual General Meeting of the Society for the Preservation of Amplitude Modulation (SPAM NZ) will be held on the Sunday morning of Queen's Birthday weekend (5 June 2011) at the NZART Conference in Upper Hutt. The business to be conducted will include the election of officers and other usual AGM matters. If you are unable to attend and would like to nominate someone for a position please send your nomination to me. Nominations will need to be seconded; and the permission of the person being nominated will also be necessary. I am looking forward to seeing some of you there.

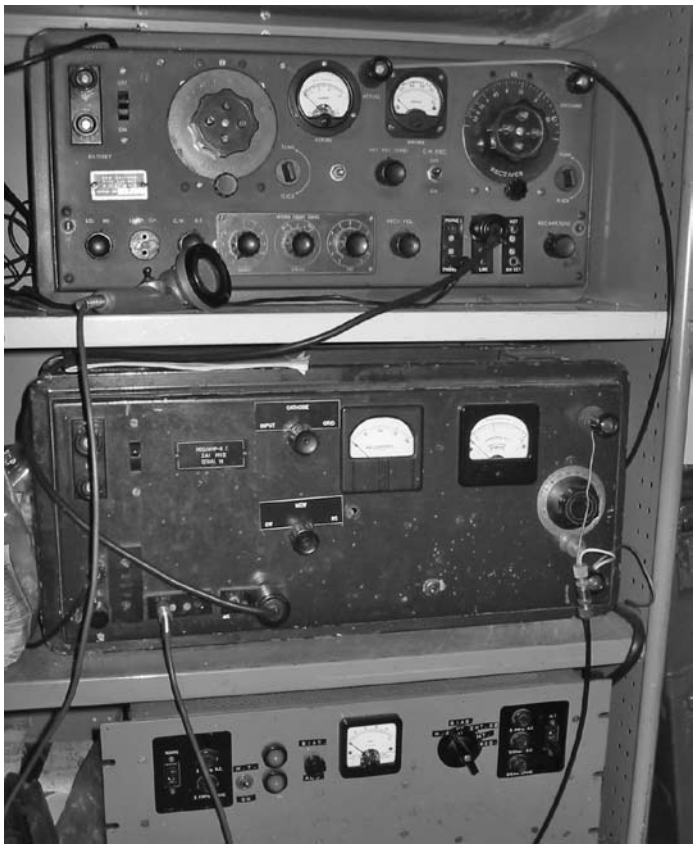
Trans-Tasman AM Net

There is now an AM net running with some VK enthusiasts. It is on 7.125 MHz (AM) at 2100 hr local ZL time. Join in with our brothers across the ditch.

ZC1 and ZA1

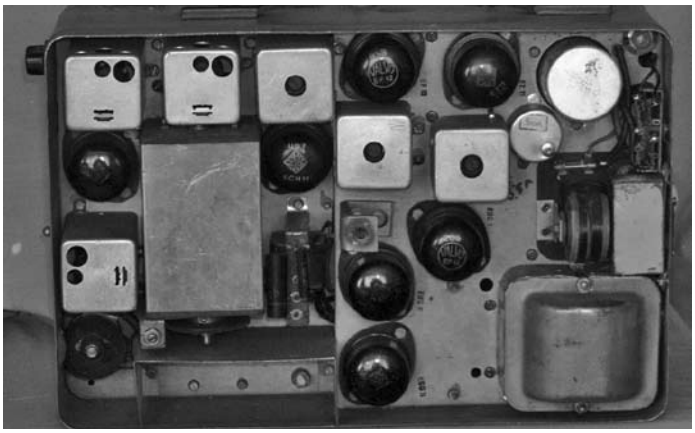
From George McLean ZL2GM:

The attached picture shows my ZC1 MK1 and ZA1Mk2 set-up. The ZC1 Mk1 is on top with the external plug-in mains power supply on the left, ZA1 Mk2 beneath and the mains power supply for the ZA1 on the bottom. There's a dummy mic lead running from the ZA1 Mk2 amplifier to the ZC1 Mk1 which is 'triggered' from the ZA1 Mk2 amplifier to bring the ZC1 onto transmit. The ZA1 Mk2 has two mic. inputs, both carbon and dynamic. (The mic. shown was originally a T17 with a stuffed carbon insert, subsequently replaced with a telephone earpiece insert as the dynamic mic.)



ZL2GM's ZC1 MKI and ZA1Mk2 set-up. The ZC1 Mk1 is on top with the external plug-in mains power supply on the left, ZA1 Mk2 beneath and the mains power supply for the ZA1 on the bottom.

WW2 German army Radione R3-1 reception set.



Radione R3-2; inside view.

The ZA1 Mk2 runs a pair of 807's as the PA's in class C modulated by two 807's in class AB1 driven by a 6V6 phase inverter, driven by a 6U7 mic pre-amp. (I run a 6CB6 mounted on an old octal socket in place of the 6U7. It gives more gain instead of the 6U7.) Normal final power input is 320-350v HT at around 100mA off 12V supply but the mains power supply has pushed this up to about 40W. The amplifier is built into a modified Mk1 ZC1 case, which has a slide on the top and louvres on one end. The chassis is about half the height of the Mk1 to allow for the height of the four 807's.

It is normally powered by two vibrator supplies drawing about 10 A at 12V on phone. On CW only one vibrator supply is used and two for MCW and phone. The RF meter was missing and the final tank tuning capacitor was cracked across its ceramic ends. All have been replaced, although the meters don't match, but that's no problem. Tuning on the final is by taps on both the plate and aerial connections and can be quite 'fiddly' to set up correctly and get the taps in the right positions for optimum output.

I think there may be still about 4 or 5 ZA1 Mk2's in existence, but this is the only survivor still going since 1943. It has a 'Serial No 19' label and at a rough guess about 20 to 25 in total may possibly have been made. The Mk1 manual mentions the ZA1 Mk2 amplifier as used for ground to air communications, but it was used for general use probably at Battalion HQ.

Both the Mk1 ZC1 and the ZA1 Mk2 were issued in August 1943 at Guadalcanal in the Solomon Is in WW2 and used by the NZ 3rd Division in 'mopping up' operations on Green Is, Vella Lavella Is and Mono Is, closing down Jap radar installations which gave advanced air raid warnings to Truk, the Japanese Navy's equivalent to Pearl Harbour in WW2.

The Radione R3 receiver; a WW2 German Army reception set.

From John Walker ZL3IB: During WW2 several general purpose 'reception sets' were produced by the Allies and the Germans. For example there were the British types R101, R103 and R109 and the American Hallicrafters S-39/R80 'Sky-Ranger'. These were fairly basic receivers; usually with one RF stage and a BFO and usually covered the MW band plus 1.8 – 18 MHz. They were used for both base reception and also troop entertainment.

The German military used similar sets and this article describes the Radione R3 reception set. I acquired this set whilst organising a permit for my antenna tower and I was offered the set by a staff member at our local Council's Planning Dept. This R3 had been brought to New Zealand by her father when a refugee from Latvia and she wanted to find a 'good home' for it; naturally I was happy to oblige.

The R3 was manufactured by Radione (RADIO Nikolaus Eltz); Vienna, Austria and is built in a metal cabinet (350 x 240 x175mm) using a curious 'chassis in a box' design so that the front panel has to be removed to expose the underside of the chassis. Photo 2 shows the upper side of the chassis. Only the tuning and volume controls are on the front panel; the rest are scattered around the top and right hand side.

The circuit is a fairly conventional three-band superhet with a double-triode output stage. The basic design features are summarised below;

- Superhet with RF-stage and BFO, IF-freq 460 kHz
- Bands; 2.5 – 6.7, 6.7 – 14.7 and 14.7 – 25.7 MHz.
- Valve line-up; this uses the so-called 'footless octal' all-metal types manufactured by Tungsram® or Valvo®. RF amplifier (EF13), mixer (ECH11), IF amplifier (EF13), diode detector and AF amplifier (EBC11), BFO (EBC11), output stage (EDD11) and rectifier (EZ11).
  The output stage is interesting in that it uses transformer coupling to an EDD11 twin power triodes.
- Power supply; this is unusual being operable from 110, 150, 190, 220 V AC mains, or from 12 Volt DC using a built-in vibrator.
- Weight; 11kg

Next issue

I hope to be including a construction article: *"A simple over-modulation indicator for AM transmitters"* by Don B Collie Jnr, ZL4GX.

Roy Symon, ZL2KH
Secretary/Treasurer,
SPAM (NZ).

New Zealand Association of Radio Transmitters Inc
National Conference
Silverstream Retreat Upper Hutt

Notice is hereby given that the Annual General meeting of the Association will be held at Silverstream Retreat Upper Hutt.
Saturday 4 June 2011, commencing at 9.30am.

Annual General Meeting Agenda

1. Welcome
2. Meeting Schedule
3. Apologies
4. Silent Keys – minute silence
5. Confirmation of Quorum
6. Report on Council Business
7. Minutes 2010 AGM
8. Annual Accounts and Appointment of Auditor
9. Officers' Reports as published in *Break-In*
10. Voting Procedure
11. Remits
12. Presentation of Rothschild Cup
13. Fixing of Venue for 2012 Conference
14. Presentation of Awards
16. General Business
17. New Councillors present thank you to Retiring Councillors
18. Stirrers Award

Debby Morgan ZL2TDM
Business Manager

President's Report 2010

At the beginning of this year, Gerry Kilpatrick ZL1BBS, a life member of our association, and its honorary solicitor, became a silent key. Gerry gave freely of his time and expertise over many years and personally I miss receiving his sage advice.

Council met for a two day face-to-face meeting at Silverstream in February and also had face-to-face meetings on the Friday and Monday of Queen's Birthday weekend during the great conference we enjoyed in Auckland. As well as these meetings, council also met monthly on air.

During the year John Hirtzel ZL3ADF, resigned as a Midlands District councillor. John has given many years service to NZART both as *Break-In* editor and as a councillor. Council appointed Topsy Scott, ZL2LS to fill the vacancy. Topsy was already acting as minute secretary for the on-air meetings and has continued to fill this role as well as her new duties.

In June both myself and Vice-President, Vaughan Henderson ZL1TGC, were the guests of the Wireless Institute of Australia at their Centennial Conference in Canberra. It was most educational to see the way that matters were handled in VK.

At the Association AGM in Auckland the matter of whether we should have an entry level licence was finally decided when the meeting voted against the move. Council were also able to keep the subscription at the 2004 rate; quite a feat considering the state of the economy. Warren Harris ZL2AJ, was appointed as National Training Officer.

A *Call-Book* was produced this year and I am grateful to Lorne Douglas ZL2AHB, the *Call-Book* editor, for all the work this entailed. The ministry have put procedures in place so that, in future, the lists of call-signs they provide us with will be more accurate.

Negotiations with Kordia regarding rental at their sites did not result in any significant reduction in costs. World Exchange kindly sponsored these charges up to the middle of 2011 meaning that changes will have to be made soon. These are currently under consideration.

Evan Sayer, our Treasurer, has made some suggestions regarding possible changes to the way we do things. One is the re-writing of our constitution to meet the requirements of the Charities Commission. If this was done the $9303 in taxation paid in the last two years would have been saved. This should also provide other revenue generating opportunities to the Council since registered charities are supposedly more attractive to businesses and individuals to give to because of their tax deductibility.

Also providing an electronic *Break-In* and *Call-Book* should be considered as cost saving measures. Evan also raises the question of whether we need ten elected representatives to run the Association. He states that it's all just food for some serious thought and a courageous Council. It would also need a majority of all members to endorse any change.

Another area of significant expense is the funding of delegates to overseas conferences such as IARU regional meetings and the like. It appears to me that there is minimal return for the significant money invested and this is something that will need serious consideration by both council and the wider membership.

An area that needs much attention is membership, recruitment and retention. Amateur radio is being seen as an anachronistic hobby, having been largely replaced in the mind of the general population by cell phones, the internet, and more modern technology. If we stand back and look objectively at where we stand in the minds of others, we are an aging minority who can conveniently be ignored. This image needs to be changed. What is the future of our hobby in the decades to come?

The NZART AREC Trust is working well. It is doing what it was designed to do. My grateful thanks go to our very capable Business Manager, Debby Morgan ZL2DL, and our treasurer, Evan Sayer. We are lucky to have people of this calibre. Thanks also to all councillors, officers, and others who have given up their time and expertise to make sure our hobby thrives and prospers.

Roy Symon ZL2KH, NZART President

Award Manager's Report 2010

IARU Region 3 had a stand at the 2010 Dayton Convention and this resulted in 34 applications for the IARU Region 3 award bringing the total applications to 57 for the year.

Other awards issued 22 WAP, 8 CJC, 1 NZC making the overall total of 102 awards issued last year. This was double the number of awards issued the previous year. During the year I ran out of pre-printed WAP certificates so I have reduced the size of the new certificate to A4 which means a reduction in postal charges. The new certificate is now printed on demand.

Alan Chapman ZL3GX, NZART Awards Manager

Business Manager/General Secretary's Report 2010

Membership

Membership categories as at 31 December, 2010 with comparative figures for 2009 are:

	2009	2010
Transmitting	1449	1561
Non-Transmitting	24	19
Overseas Members	25	28
Complimentary/Associate Branches	91	87
	1589	1695

Headquarters

Firstly, as I am still being asked how my new home is. Steve and I did not move house as was planned at the beginning of 2010. Instead sadly, he was actually made redundant in July last year and is yet to find employment. The country is certainly experiencing some very tough economic times. This is no more apparent than in hobby organisations such as NZART.

It has not been a good year all round, Council had to appoint two new members as two left for various reasons. This placed considerable strain on the President and elected Councillors.

Justification for the existence of a national headquarters appears to be one of the biggest concerns to many members. Whilst I totally support many of your views, rest assured, I do not have an 'ivory tower' office, nor do I have the most up-to-date state of the art equipment; however I note that many members would believe this to be the case. Furthermore, I see a very definite lean towards making the business manager position undertake more duties, but at the same time, having the expectation to keep costs down.

With this in mind, I placed a proposal to Council in June at their Face to Face meeting, for various scenarios as to how HQ could operate if the Association could no longer afford an office environment. Council considered them, however felt as the lease was not increasing at this time, to remain with the status quo. The lease period will now be reviewed in 2012, so I will again be looking at the most cost effective options, to ensure members get value for money.

I also introduced (by executive decision – that's me) another small but interesting cost cutting measure in 2010. Part of the operational costs is postage, therefore I decided NOT to send out branch circulars on a quarterly basis, to see if this could reduce costs, and see what affect if any on communication between HQ and branches. As I said, this was interesting, I received NOT one complaint. Does this mean that branches are receiving enough information, via *Break-In* and *HQ Info-Line?*

The time it takes to prepare a branch circular, paper and photocopying, plus postage all adds up. It will be interesting to see in our annual audit if this has decreased, although we did see an increase in GST, so the benefits may have been absorbed by this.

***Call-Book* 2010**

I was very grateful to the *Call-Book* team (Lorne Douglas specifically) and the tremendous efforts in producing an excellent *Call-Book*, and CD Rom. While there were a small number of errors, the publication is superb.

I would like to remind members, to consider with whom they share their *Break-In, Call-Book* and CD Rom. While it was great to see the last five years issues of *Break-In* included on the CD ROM, plus the *WIA Call-Book,* it has become obvious that many non-members wait for such special editions in order to catch up with amateur radio in New Zealand.

Members, do you really want your subs to continue to increase, while others in your branch/district receive the same benefits at no cost?

Debby Morgan ZL2DL

Break-In Editor's Report 2010

So far this year the supply of copy has been not over abundant. I have noticed a significant increase in the number of articles relating to antenna design and construction and fewer general constructional articles. I guess this reflects the changing pattern of amateur radio with almost everyone using commercial gear. Antennas remain one of the few areas still open to home-construction and experimentation. On the debit side we have been unable to find volunteers to take over the Short Wave Listening and QRP columns.

There has been a welcome increase in "Buildathon" type projects and reports of successful Buildathons. These augur well for recruiting more young, and young-at-heart, people into amateur radio. Many of these activities have been supported by grants from the NZART Radioscience Education Trust Inc.

Not so good is a drop in advertising from commercial sources. This has left the inside back cover empty so I have used it to provide colour pictured from selected articles; the improvement is marked! Sadly, appeals to members with commercial connections have yet to generate more advertising; even low-key, low-cost "Classifieds" would be welcome. The number of HAMADs also remains steady, with most of the HAMADS being for "Wanted" items.

I was pleased to meet with Council and members at this year's NZART Conference. I advised them that I had been concerned by recent criticisms of *Break-In's* content and format etc from a few members of NZART. However, members with whom I spoke at Conference were gratifyingly supportive. In the more recent Council "Opportunity Survey" May 2010 there were also a few statements that *Break-In* was "old fashioned" so I have sought advice from our typesetter and we are planning some minor typographical and page layout changes to improve readability etc. I plan for these to take effect in the January/February 2011 issue.

Further to these comments, the Editorial Team are actively organising another Readership Survey to try to gauge changes in *Break-In* readers' wants and needs; the last survey was in 2001. We hope to present this Survey in the January/February issue of *Break-In* and David Searle ZL3DWS has kindly offered to assist with making this available in an alternative webpage format. To encourage a good response Council have agreed to provide a Lucky Draw prize for respondents.

John R L Walker ZL3IB, Editor

AREC Report 2010

Replacement equipment has steadily been rolled out to the various Sections that have requested updated radios. The NZART/AREC Emergency Funds Trust, funded by NZSAR and the NZ Police have made the above possible. Indications from NZSAR are that future funding may be cut somewhat due to the economic climate. We await the outcome.

The earthquake that shook Christchurch is a timely reminder of what can happen in New Zealand and the need for all of us to have emergency equipment available and ready at all times. Commercial communications services came through unscathed however had the quake been slightly stronger it would have been a different story. My thanks to all operators who assisted with Communications in the clean up that followed.

Several meetings were attended throughout the year including a two day Technology Challenge which was attended by all stake holders in NZSAR.

The NZ LSAR Conference held in Hokitika was well attended by AREC members with a presentation on AREC by Area 2 Manager John Yaldwyn.

AREC Secretary Doug Cooke continues to produce the required reports that are part of the SLA with NZSAR along with keeping the membership data base up to date.

My thanks to the Auckland team that runs the annual Communications exercise along with the production of ID Cards.

Many of you are regularly busy with both training and genuine operations run by the Police and more recently AREC assisted the RCCNZ with comms on a search in the South Island.

Keep the reports coming in as without them no one can see what hours we are contributing to the overall Search and Rescue picture. Section Leaders Nets were well attended through the period and remember if you can't be on yourself arrange for a deputy to do so.

Jeff Sayer ZL 4JS/ZK 6EX
AREC National Director

NZART Webmaster Report 2010

Two major events took place with the NZART web and e-mail Services during 2010.

In March, the web and e-mail services was transferred from an ISP (Internet Service Provider) in America to one in New Zealand, and in November, the web was transferred to a Contents Management System (CMS).

Change of ISP

A team consisting of Jim Tittsler ZL2IA, Mark Foster ZL1VMF and Jamie Pye ZL2NN has been working for several months on a project to migrate NZART web and e-mail services to a new hosting provider.

The change was done on Sunday 14 March 2010 when the NZART web and e-mail services were changed from the USA ISP to a NZ ISP IServe.

Change to a CMS

The change from a static paged website to SilverStripe CMS was made during the afternoon of 27 November 2010 and took a couple of minutes. A refresh of the user's internet browser was all that was needed to access the NZART CMS website. Jim Tittsler ZL2IA, assisted in organising the databases while Jamie Pye ZL2NN, worked on the file conversion and CMS Web Site structure.

NZART Website and E-mail Services Unavailable

No outages were experienced in 2010.

NZART Site Statistics–Averages Per Month

Volume	Visits	Pages Accessed	Files Accessed	Hits
5.73 GB	20857	89633	206700	286022

E-mail Users as at	Alias	Groups/Users	Infoline	Total
January 2010:	416	5/150	723	1289
December 2010:	*350	7/210	776	1336

*Non-members removed

Jamie Pye ZL2NN

Local Government Liaison Officer Report 2010

As for 2009, district plan changes and reviews predominated in activity relating to antennas and planning issues.

The decision of Wellington City Council on a Plan Change was a refreshing approach to the perceived complications of RM planning and meeting our needs. Provisions for the amateur radio service were included in the Utilities section of the District Plan, with a simple set of rules specifically providing for an "amateur radio configuration" defined as "… the antennas and associated supporting structures which are owned and used by Licensed Amateur Radio Operators …", with exemption from all other utility rules and definitions.

The Council allowed simple poles up to 100 mm diameter, with no limit on number or height and with minimal boundary clearances. However the Council placed unreasonable height limitations of 8 metres and 10 metres (for the outer and inner residential zones respectively) for any supporting structure exceeding 100 mm diameter, such as would apply to a lattice mast. This decision has been appealed by the Association, in an endeavour to allow higher lattice masts.

There is merit in Councils placing any controls of amateur antennas and their supporting structures in the Utilities section of district plans, where they will be less exposed to general public scrutiny than if placed in the rules for residential and other zones. Of course the applicable rules must be appropriate for amateur radio communications, the rules for Utilities are seldom so.

Hearings for Tauranga City District Plan have been completed, and a decision is awaited. Again the main thrust of the Association's submissions was to gain less restrictive controls on our antennas, and the Wellington decision was cited to the Council as an example which could well be adopted in Tauranga (except for the appealed condition limiting lattice mast heights).

Again the Town and Country Planning Appeal Board Decision No. H 101/83 dated 21/11/84, of Judge John Bathgate was cited in support of our argument. This decision is available on the NZART website, and anyone experiencing difficulties should try and utilise the decision to advance their case.

Consultations were held with Rangitikei District seeking reasonable accomodation of amateur radio antennas in their forthcoming Plan Review.

The review of District Plans is required to be carried out every ten years. Many Councils are known to be preparing plan reviews and Branches and individual members must respond to these reviews at the consultation and the submissions stages. Not to do so could be disastrous for future antenna installations. The review is the only practicable opportunity to rectify any unreasonable restrictions on antennas and their supporting structures.

An inquiry by a branch to a local authority will reveal the stage a local authority is at in its review process, and should provide opportunity to respond appropriately. Such information should be obtained earlier rather than later, before council planners have their plans fully prepared. The problems we are experiencing now will not be overcome without effort by branches to respond. All branches should periodically check with their local authority to ensure no opportunities are missed or squandered. To do nothing is to invite disaster.

Advice was also given in response to several individual inquiries where members were being denied reasonable antenna installations or were having to deal with complaints from vexatious neighbours. Regrettably, in several situations the district plan could not be overridden, in others, district staff were ignorant of their own rules, responding to complainants without understanding the plan they were supposed to be administering.

This report serves as a reminder to actively oppose inappropriate rules, since once a plan is finalised, it becomes the governing document for the next 10 years, and leaves no avenue for recourse.

Mike Newman ZL1BNB, Local Government Liaison Officer

Amateur Radio On The International Space Station New Zealand Report 2010

I have had 3-4 enquiries from clubs/schools this last year. Application forms have been provided, but nothing has eventuated. This is disappointing, I am reluctant to chase up the enquiries at this stage as its all fairly simple and straightforward, to fill out the application form. My email address and phone number is provided should there be difficulty in form filling.

When it gets closer to the time a contact with the ISS may take place, emails with questions that need quick answers seem to be standard fare, and one needs a quick response.

Peter Norden ZL2SJ
ZL ARISS Coordinator

Headquarters Infoline Report 2010

Production Method

All items for inclusion in Infoline are changed into a text format which is then HTML-coded. Two HTML formatted documents come out after compiling:

- One fully HTML coded document is used for pasting into the e-mailed document, and
- The other has the HTML coded body section pasted into a page of the NZART Web CMS (Contents Management System).

Closing Deadline

Midday on the Sunday of the e-mailing. This can be flexible if I am told of items that are coming for inclusion.

Availability of Dates of Publication

You will find these dates at: <http://www.nzart.org.nz/h-quarter/infoline/2011-timetable/>.

Both the Official Broadcast and Infoline dates can be found for 2011.

Number of Infolines

Twenty-four infolines were sent out in 2010. The Infolines numbers were 199 to 221 with one special, Infoline number 23S. Special Infolines are produced if the timing of the publication of any NZART HQ item cannot be delayed until the next timetabled publication date. President and Council Election results is a typical use of this service.

Infolines on The NZART Web Site

All published Infolines are available on the NZART website in the Infoline Archive section. Numbers 1 to 221, covering the years 2001 to 2010, are available. On the NZART website infoline page, the current year can be found in CMS and PDF formats. They are available at URL: <http://www.nzart.org.nz/h-quarter/infoline/>.

To Find Items in Infoline for Years 2006-2010

Each Infoline for a year has been combined into one file. To assist in the locating of a searched item the Infoline number has been added to each line of the file. See the URL above for these files.

Jamie Pye ZL2NN

Administration Liaison Officer's Report 2010

2010 was again a very busy year with a number of different matters requiring submissions to, or discussions with, the Ministry of Economic Development.

500 kHz (or 600 metres)

As members will be aware, NZART was successful in gaining an allocation from 505 to 515 kHz on a temporary basis pending an international allocation to radio amateurs. For further information, see HQ Infoline 202.

The Association has also been active on the international scene; providing inputs to the Ministry to establish the New Zealand position for a world wide allocation in the vicinity of 500 kHz and to the IARU – all in preparation for the 2012 World Radiocommunication Conference at which this will be discussed.

3.5 MHz – Short Range Device General User Radio Licence (SRD GURL) allocation

In July, the Ministry issued an updated SRD GURL which included what appeared to be a new allocation for auditory aids from 3.640–4.040 MHz. We expressed concern that this had not been discussed with NZART before it was published and that it had the potential to interfere with amateur signals in the 80m band.

The Ministry apologised for not consulting us and explained that, although this frequency range was new to the SRD GURL, these devices had previously been exempted from requiring a licence and it was decided to include them in the SRD GURL so that information on them and the conditions under which they are used would be more widely available.

They advised that this allocation had been made in 2008 and, as far as the Ministry is aware, the low power coupled with the (primarily magnetic) mode of operation has meant that there have been no problems experienced either by Amateurs or users of these devices.

50 MHz – Planning for Digital Television and New Uses

As members will be aware from last year's report, the Ministry has agreed that the entire 50 – 54 MHz band be returned to Amateurs when Digital Switch Over (DSO) has been completed.

During the year further work has been done in preparing for the return of this spectrum and, in September, the Government announced that DSO will be completed by 2013 – significantly earlier than the 2015 date that had previously been circulating.

432 MHz – Short Range Device allocation

The change to the SRD GURL mentioned above also included changing the permitted modes in the (existing) 433.050–434.790 MHz SRD allocation from "telemetry and telecommand" to "unrestricted".

We expressed concern at this change (again without consultation) as this had the potential to significantly increase the interference we experience on repeater input frequencies in the SRD GURL range.

The Ministry explained that this change was made to remove ambiguity about whether a myriad of remote control devices were, or were not, covered by the terms "Telemetry and Telecommand" and they did not consider that this had the potential to significantly widen the types of devices that would be permitted.

They also pointed out that in a shared band, with non-interference expectations, there was a need by all users to protect their use from other technologies with gate CTCSS coding, digital or other technologies. See FMTAG notes in Nov/Dec *Break-In* for further information on options available to repeater owners.

We raised the specific issue of the importation of walkie talkies capable of transmitting at higher than the permitted power that had been the subject of previous compliance action. The Ministry assured us that they would continue to take compliance action against such imports and that recent changes to legislation provided them with greater powers in their "border control" role.

Channel 39 – Planning for Digital Television and New Uses

As part of the preparation for DSO, the Radio Licences for Channel 39 ATV repeaters were cancelled and FMTAG advised owners of the process they needed to follow to apply for an interim (until the frequency is needed for DSO) Spectrum Licence.

NZART has been meeting with the Ministry to explore alternative options for ATV transmissions in the UHF band and we will continue working with them to agree an approach for Amateur television.

900 MHz – Band Re-planning

In last year's report, it was noted that the Ministry was looking at re-planning the 900 MHz band. In May, the Minister announced details of the changes.

As a result of NZART submissions, the NZ Amateur allocation will, from 2015 have access to 915 to 928 MHz. We will, however, be losing the 928-929 MHz portion of the present band and be sharing the sub-band 920-926 MHz with high power (4 W) RFID devices. For further information, see HQ Infoline 210.

75 GHz – Short Range Devices

During the year, an enquiry was received from the Ministry as to whether we would have any concerns regarding increasing the permitted power for

SRDs in the 76 to 77 GHz band from the current 1 watt eirp. The motor industry had requested that New Zealand align our GURL with international practice and increase the power to 25 watts.

After consultation with Amateurs active in the microwave area, we advised the Ministry that there is likely to be little concern regarding the proposal.

Call-Book information

As members will be aware, there are a number of errors in the call-sign listings in the 2010 *Call-Book*. These listings were based on information extracted from SMART for us by the MED. Unfortunately, the final list supplied by the MED omitted a number of call-signs that had appeared on previous lists. It is not clear at this stage what caused this but the MED has written to us apologising for the errors. For further information, see HQ Infoline 220.

Call-Signs; E, X, Y and Z series

Some preliminary discussions have been held with the Ministry regarding Amateur access to the ZLnE, ZLnX, ZLnY and ZLnZ call-sign series. The Ministry has no objection in principle to the release of the ZLnE, ZLnX and ZLnY series but wishes to retain the ZLnZ series to avoid confusion with the ZLZ numbering series used for their Suppliers' registration system. NZART will discuss this further with the Ministry in the New Year.

Client Information in SMART

Members frequently express concern about the accuracy of Call-sign, name, address and other information held in the SMART. As a result of representations by NZART, the Ministry has started a process of contacting all those listed in SMART with a request that they update their client information. For further information, see HQ Infoline 221.

Foundation Licence

As a result of the decision at Conference 2010, the Ministry has been advised that NZART will not be proceeding with a request for "Foundation" amateur operator's certificate.

General Amateur Operator's Certificate (GAOC)

The Ministry advised us that they are looking at aspects of the current Radiocommunications Regulations and will, in due course, be asking our view on matters related to the GAOC such as whether changes are required to the current syllabus to update it, incorporate additional matters (eg an operating test); or change it to better match the CEPT requirements.

Internet-connected Amateur Radio

The Ministry raised some concerns with NZART during the year about IRLP, D-Star, Echolink, APRS and similar modes as they do not appear to fit within our current licence (GURL) conditions.

After considering the material supplied by NZART, the Ministry concluded that no changes are required to the current Amateur General User Radio Licence conditions to accommodate Internet-connected amateur radio modes such as APRS, IRLP, D-Link, etc. provided the transmissions are taking place from an Amateur operator's property; and frequency coordination with non-amateur services is not required. For further information, see HQ Infoline 219.

Thanks

I would like to thank the large number of people who have contributed, formally or informally, to many of the matters discussed above – it would not be possible to carry out my role without their contributions.

Don Wallce ZL2TLL, Administration Liaison Officer

IARU Liaison Officer's Report 2010

Activities within IARU and IARU Region 3 have been limited over the past year as regional effort concentrated on completing tasks associated with the previous year's IARU Region 3 Triennial Conference.

The minutes of that meeting have now been completed and a draft referred to the Conference Chairman, Terry, ZL3QL, for any final corrections. Terry reports that the minutes are very thorough and an excellent record of the business transacted in Christchurch.

Various IARU newsletters received by the IARU Liaison Officer have been circulated to Council. The latest has prompted discussion on the 600 metre band. It may be appropriate to remind Council that it is the Liaison Officer's task to liaise between the Union and our Association and while the IARU Committee has expertise in many areas, it is important that the views expressed to the Union are those of NZART.

With the approach of the NZART AGM, it is timely to review the make-up of the IARU Committee and look for expressions of interest from NZART members from throughout the four districts. While the committee recognises the value of having a representative in the Wellington area who can easily communicate with our Administration, this is by no means essential.

What is essential is that the committee has the input of the best people available and, with so much of its activity now done by email, location of members is of lesser importance. Continuity and excellent team co-operation are vital to the success of the operation of this important group.

Consideration needs to be given to attendance at the next IARU Region 3 Conference and to the preparation of positions on international aspects so papers may be prepared for presentation, and our association may continue to play its highly respected role within IARU.

John Lochhead ZL4QS
IARU Liaison Officer.

Call-Book Editor's Report 2010

A full *Call-Book* was published this year. The spreadsheet supplied by RSM missed out 75 known call-signs and an errata sheet was published with the next issue of *Break-In* which addressed any missing NZART members plus a few non-members who advised us they were missing. The errata sheet also listed incorrect details which were advised by members and non-members. It also had a deletion list of Silent Keys inadvertently re-introduced by RSM or those that had not been advised before. It is interesting that more advice is received about Silent Keys or incorrect addresses when there is a hardcopy list to be reviewed as compared to reviewing an online spreadsheet or SMART.

A major effort was made to ensure Branch details were up-to-date. The online Branch list has proved worthwhile to 25% of Branch Secretaries who advise of changes regularly. The reminder posted out by HQ produced another 25% updates. This was followed by emails to Branch contacts which produced another 25% return. The remaining quarter were contacted by telephone mainly due to bounced emails which filled in the remaining details.

There is a concern that other databases such as NZART Examination Supervisors, Honorary Life Members etc may be becoming out-of-date or in danger of doing so and the method of maintaining these databases should perhaps be reviewed.

A CD was published with the errata sheet which included an amended *Call-Book,* the *WIA Call-Book* and pdf's of *Break-In* from 2005 to 2010.

The news that RSM are planning to revise SMART online so that call-sign details can be directly downloaded from their website is most welcome. It is planned to compare the next spreadsheet downloaded from the RSM website with the current call-sign list in order to assist with checking for incorrect listings as well as checking it against current NZART members. This method can never be completely satisfactory due to the removal of Silent Keys, cancelled certificates and introduction of new operators.

Lorne Douglas ZL2AHB
Call-Book *Editor*

NZART ARX & Examination Co-ordinator Report 2010

Another year and the SMART program introduced by RSM in 2006 is firmly ensconced in the lives of radio amateurs. This past year has seen some minor changes, while almost transparent to most of you, has impacted on all of us in one way or another.

As the NZART appointed ARX, RSM processes and procedures govern me; this is monitored by way of regular auditing by RSM. This past year I have been audited on two occasions. Although this will not affect you directly, it is paramount that whatever process I follow in SMART, I must have some form of paper documentation to prove authenticity. It is therefore imperative that this is provided when you request a new application or change to the RSM database, a phone call is not sufficient evidence.

Moreover where notification of a Silent Key is required, I must receive *in writing,* by

1) a family member, *or*

2) a friend *or*

3) a branch member,

the authority to remove the call-sign so this can be placed on the RSM database.

In October, Warren Harris ZL2AJ was appointed as the Deputy NZART ARX. Warren together with Peter Grey, Radio Spectrum Management Technical advisor, spent the day with me in November training in SMART processes and procedures to ensure we were both practicing the same methods that RSM and NZART require.

Warren, having much more technical knowledge than I do, has undertaken to update all amateur radio training material for NZART. Peter confirmed that RSM prefer a 'one standard examination for all ARX's' and offered any assistance in ensuring this be done in the future.

To quote the words of Fred Johnson ZL2AMJ in an e-mail to Council and copied to Gary Bold ZL1AN and Gerry Kilpatrick, NZART solicitor, and fellow amateur in 2006 …

"The question bank is the intellectual property of NZART and can only be used within NZART systems and procedures to ensure the integrity of the examination process is maintained."

It is therefore important that we all work together to ensure continuity of amateur radio practices and procedures, and increasing amateurs in New Zealand.

The following are examinations results for 2010

2009	2010
70	52

These figures include only those examinations sat through the NZART system. There are other agencies conducting examinations and issuing call-signs, however we do not know the results from these.

The examination process remains the same; however, every successful candidate on submitting an application for a call-sign has, this year, received one year's free membership to NZART.

Sadly, this is a very poor result, given that only 17 branches out of the listed 57 who advertise Examination Supervisors on our web page, actually actively partook in an examination with candidates.

This year North Shore branch is to be congratulated for their excellent effort of 13 successful passes.

Debby Morgan ZL2DL ARX 86

Frequency Management And Technical Advisory Group (FMTAG); Report 2010

FMTAG has worked steadily throughout 2010 providing advice and guidance on licensing matters, to Council and members, and assisting the Administration Liaison Officer. We have answered many queries from both NZART branches and individual members. Our streamlined procedure for licence applications, introduced in 2009, is working well, with most applications proceeding to the granting of licences in under a month.

The usual work with repeaters and beacons has continued. We now have 298 repeaters and beacons registered on the MED licensing data base.

247 licences were renewed during the year, and 24 repeater, beacon and link licence applications were investigated, crafted and certified in accordance with the MED's Radio Licensing Certification Rules (also known as PIB38), during the year, at a saving to NZART members of $9,600 in MED Engineering Certification fees.

Most Branches have now transferred their STSP repeaters to the single All New Zealand Short Term Special Purpose repeater licence, with savings to the Branch of $46 per annum for each individual STSP licence relinquished. Please refer to MED Licence 209732 and to page seven of March/April 2008 *Break-In,* for the terms and conditions of the STSP licence.

The third version of the MED's Spectrum Management And Registration Technology (SMART 3) licensing system, introduced in early 2009, is still providing surprises. These usually appear following the (approximately) monthly software upgrades.

One major bug in SMART 2 (the previous version), the continued listing of deleted and expired call-signs, was initially fixed in SMART 3, but re-appeared prior to the MED creating the listing for the latest *Call-Book*. One downside is that SMART 3 processing runs noticeably slower than SMART 2.

The MED appreciates our testing of, and reporting on, the performance of the software it uses!

My thanks go to the many NZART members who have assisted FMTAG during 2009. Finally, my thanks also go to Doug ZL2TAR, and John ZL2HD, for their valuable support and advice during the year.

David Andrews ZL2SX
Chairman FMTAG

Break-In Advertising Manager's Report 2010

There has been a decrease in invoiced commercial advertising over the last year and the comparison is as follows:

2008	$8,319.50 excluding GST
2009	$10,001.14 excluding GST
2010	$8,530.75 excluding GST

The main reason for the difference between 2010 and 2009 is that FeatureTech stopped advertising after the January/February issue. They also stopped advertising in WIA's *"Amateur Radio"* magazine. The 2010 figure includes three ads in *Call-Book*.

The above figures do not include a small amount paid either by members who have used more than their 30 free words for Hamads or non-members who have paid for Hamads.

Members have not been forthcoming in advising of suppliers who may be interested in advertising in *Break-In* although one member has said he would advise me of potential advertisers he came across in the course of his work. If I have seen someone recommend a supplier in one of the mailing lists I have approached this supplier.

Jaycar have recently started advertising in WIA's *"Amateur Radio"* and both the Australian and New Zealand offices have been approached without success.

Lorne Douglas ZL2AHB
Break-In *Advertising Manager*

Official Broadcast Report 2010

February through December 2010 the NZART Official Broadcast was made at 8pm and 9pm on the last Sunday of the month on 3.9 MHz LSB, the UHF National System and a large number of two metre repeaters. A special Conference Official Broadcast was made live from the Auckland Conference at 8pm on the Sunday of Queen's Birthday weekend. Throughout the year a team of helpers has ensured that Official Broadcast distribution occurred and with the assistance of the NZART webmaster Jamie Pye ZL2NN, an mp3 file of each broadcast has been available on the NZART web page. To all involved my thanks and appreciation.

Regular contributors for 2010 were the NZART President Roy Symon ZL2KH, NZART Business Manager Debby Morgan ZL2DL, Rosemary Boshier ZL1RO for WARO and Stephen McNeill ZL4HG with the NZART Branch News.

The Official Broadcast's effectiveness as a communications medium with members would be enhanced by a greater reporting from the Association Executive on Association issues, activities and policies.

Selected items from the USA's Amateur Radio Newsline bulletin were used to give the broadcast an international flavour. My thanks to Bill Pasternak WA6ITF and the Amateur Radio Newsline for the permission to use their material.

The transmission of the December 2010 Broadcast marked a 25 year milestone in the ZL2BHF production and anchoring of the Official Broadcast. To mark the occasion, a special 16 minute story was prepared covering the Broadcast development over its first ten years complete with 36 clips of New Zealand Amateur Radio related moments from the Official Broadcast Archives. My thanks to Stuart Watchman ZL2TW for his article in the Nov/Dec 2010 issue of *Break-In* documenting the 25 year milestone.

Emailed Branch newsletters provide a valuable source of information. Remember, you may e-mail a copy of your club's newsletter, or other information directly to the Official Broadcast. E-mail <zl6a@nzart.org.nz> it has never been easier!

Finally thanks to you the listener. If you have any comments or suggestions you wish to make about the Official Broadcast please drop me a line or e-mail <zl6a@nzart.org.nz>.

Jim Meachen ZL2BHF

NZART QSL Bureau Manager's Report 2010

The Association's sincere thanks go to those of its members who, from time to time, saw fit to enclose a donation with their QSL cards. Their generosity has helped to keep down the Association's day-to-day running expenses.

Year 2010 saw an increase of four per cent in numbers of cards sent out by ZL operators whilst there was a two per cent decrease in the number of incoming cards from overseas amateurs.

During the past year, the NZ Post Office increased its postal charges partly due to the Government's decision to ramp up GST by 2.5%. This provided a windfall to the PO as it needed to round up its prices for stamps but despite this, the postage for large envelopes used for mailing QSL Cards to the ZL3/ZL4 Sub-bureaux suffered an increase of 20%! Over-all, there was a minimal inflationary effect on the Bureau expenses.

During the year Ross, ZL1BGB, assumed the position of ZL1-Prefix Sub-bureau Manager following the untimely passing of Ian ZL1BFB. The mailing details for the ZL1-Prefix Sub-bureau remain unchanged.

My thanks go to our five Sub-Bureaux managers, namely Dave ZL4OZ, Ken ZL4HU, Tony ZL2AGY and Ross ZL1BGB, along with the late Ian ZL1BFB, who attended to the stuffing of envelopes for all of the 'deserving' during 2010.

B E Stewart ZL2RR
Manager

Officer Liaison Councillor Report 2010

Firstly, on behalf of Council, I would like to thank all Officers and Volunteers for the vital work that they have done during the past year.

Each year, the Officer Liaison Councillor sends forms out to Officers of the Association asking them how long they intend to remain in their position as an Officer of the Association, and if they have any comments regarding their position as an Officer. A number of returns show that the Officer involved is only willing to commit the next one or two years to the Officer position. This indicates the need for Officers to recommend to Council, a Deputy for their position to ensure continuity of the position.

Deputy positions are available for all Officer positions and only a few are currently filled. If members are interested in becoming a Deputy for any Officer position, speak to the Officer involved in the first instance.

During November 2010, Council dissolved the Officer position of call-sign Compiler, following the request of the Officer involved. This position became redundant because of the method in which NZART gains access to the information used in *Call-Book*.

Tony Case ZL1UD
Officer Liaison Councillor

NZART Monitoring Service Co-ordinator Report 2010

Successes

With the assistance and intervention of Peter, VK3MV, IARUMS for Region 3, the Bruny Island Tiger Radar system has also been successfully told by the WIA ACMA to not cause secondary interference to 30 metres or 20 metres. Having liaised with the New Zealand Station Manager, they have had a number of issues, which has prevented the Tiger system from being operational. An intermodulation product or IMD was identified by ZL2iFB on 1908 kHz from two commercial medium wave broadcast stations in Christchurch. A request was sent directly to the station engineer about the issue, which resulted in the removal of the issue.

Alleged Pirates

The ZL9BI Case: An alleged pirate calling himself "Tom", has been discovered by ZL2iFB (Gary Hinson) apparently confusing the DX Community on 30m band 40m after normal closing time for the pubs ie. 0100 – 0200 hours New Zealand local time. According to a SWL report, he is located south of Buller, in Queenstown. But apparently this person moves about quite frequently. No sightings of him have been seen since May 2010, as verified via the DX Cluster – DX Summit.

We do have a notorious pirate as above, who has caused problems with Australian and International Radio Amateurs, who are becoming increasingly annoyed due to working what appears to be a legitimate station but later finding out, it was a pirate. Call-signs currently include: VK0HI and ZL9BI. Bands used include 80m, 40m and 30m. However, we do depend on collaboration via the various DX lists, as he seems to disappear for long periods of time, before suddenly reappearing with his good CW fist. We will continue to add entries to DX Clusters to encourage other RAs to participate. It is very much a case of being vigilant and depending on good intelligence through collaboration with other groups.

Complaints

One complaint was received via ZL1CDX (Turner) who apparently did the role of MS Coordinator before Bob Knowles, about the RD1 early morning net on 80 m using derogatory language. A quick e-mail to Turner was distributed to indicate that both Gary and I would be listening regularly to the net. We have received no further requests for assistance. Case presumed closed.

Liaison

Good liaison has been maintained throughout the Pacific Region via the ZL2iFB IntruderWatch site, which has been very useful in terms of col-

laborating new reports and SWL, Radio Amateurs including BL Manohar (Arasu) VU2UR, he remains active by interacting with Region 1 and 3 MS activities. His previous assistant VR2BG Brett Graham remains active within the IntruderWatch via Google (set up by ZL2iFB Dr Gary Hinson) and via the IARUMS Region 1 Intruder Alert list.

Good liaison with Region 1 IARU MS has continued through the year, including the interchange of information to identify new OTHR FMCW radar systems; although their DF results using a single station results in many erroneous readings. The ITU Baldock Monitoring Station report has been used at times, to verify readings. The Region 2 IARU MS remains unfilled at present.

The Region 3 IARU MS Peter Young, VK3MV has been providing monthly reports, up until July 2010 and then these stopped entirely. These were very useful, but he has decided to stop creating monthly reports. I have liaised with him directly on a number of issues from Tiger to OTHR signals requesting his assistance to DF intruders. He remains very helpful, when I deal with him directly. Monthly reports have been received regularly from Bob Knowles, ZL1BAD and from Len Martinson ZL1BYA occasionally, which are warmly welcomed.

Voluntary Observers often contribute reports either via the Google IntruderWatch site or via the ZLDX and ZLHAM reflector sites, with audio samples, where possible.

Equipment Inventory

Len Martinson ZL1BYA, has returned the JRC 535 receiver and he returned the Hoka LF Data Unit at the same time to me. The JRC 535 receiver has developed a fault at the front end, which requires professional diagnosis to resolve. It has a bandwidth of approximately 12 kHz maximum, whereas many of the wide band intruders either have multiple signals on the same band or far exceed the bandwidth of the inbuilt filters. It was noted that there is no front end protection within the JRC 535 receiver, ie. back to back diodes, which many receivers have built in.

The Hoka LF Data Unit requires a computer with DoS capability, ie. Windows 95/98, which has been superseded with Windows XP and Windows 7. During the year, I requested assistance from the Wavecom.ch Company as they provided a full Wavecom W61PC card to Region 1 MS to assist them to analyse digital signals. Fortunately, my cheekiness paid off, resulting in the Assistant Director of Wavecom providing me with a W-Code USB key to be able to run the professional analysis of signals. This has been very useful especially in determining the type of OTHR systems that have inundated the various AR bands, ie. FMCW, Stereo (OTHSAR) and ROTHR (Remote/Portable systems) during 2010.

We need to acknowledge the assistance of Wavecom via the NZART web site due to their generosity.

Suggestions for 2011

1. Prioritise efforts within the primary amateur radio frequencies to select a hit list of intruders per month, ie. broadcast stations on 40m. Raise suggestion to IARUMS Region 3 Coordinator to raise our success rates and to make best efforts of resources.
2. To create a Volunteer Observer league table and publish the number of intruder reports and on which bands they are reported from individuals within bi-monthly contributions and associate that with an annual award scheme? Annual or monthly, DF construction competitions?
3. Include educational pieces within the bi-monthly *Break-In* on various topics commencing with emission types in Jan-Feb 2010 edition. Completed and following on in Jan-Feb 2011 with a change in perspective on interference and construction of DF loops for location purposes.
4. Continue to request assistance via Clubs and via reflector groups to raise the profile of monitoring activities and in particular encourage more reports for direction finding purposes. A greater presence on air is required from me in general, which I will endeavour to do during 2011.
5. Encourage DX Cluster, IntruderWatch to report OTHR and Pirates by example to assist the Monitoring Service and Intruder Watch participants. Use of the ZL6IW call-sign (with separate Log book) on National System and also 80m net on a weekly basis.
6. Simplify the ability to provide reporting. I have been discussing this with the Web Master about putting together a similar logging system that IARU MS Region 1 have, with very effective and easy to log reports.
7. I will have to make the investment of a Software Derived Receiver (SDR) due to the amount of bandwidth that can be covered and has the ability to record different bands for analysis purposes. Plus the ability to use it as a full blown spectrum analyser with the Wavecom W-Code/decoder.

Comments

There are in general those who are absolutely passionate about protecting the Amateur Radio spectrum (primary or secondary), and actively participate in reporting, although considerable nudging and reminders are required via various ZL reflectors. There is also a general sense of frustration within the Monitoring and ZL AR fraternity, as experienced when I recently requested comments on using the UHF National System and re-instating the ZL6IW weekly skeds, that there is insufficient successes and action taken to remove intruders, eg. Russian beacons on 40 m and OTHR systems (even if they are used for defensive purposes). It appears that many experienced DXers have become disillusioned with the ITU and their ability to take action on persistent intruders.

The very tenet of being a good Short Wave Listener is that of listening, including Radio Amateurs; the ability to listen before one transmits. Good DXers always listen, before transmitting; therefore naturally all should, by default, be good listeners. What needs to happen is to encourage them to actively report what they hear regularly, to assist the whole community.

Intruders are becoming technically more sophisticated, and more persistent in their use of digital techniques, but these have to be in balance with traditional listening skills and the right tools for the job; these include spectrum analysers, audio analysers. Good basic skills such as Direction Finding can be used for instance for hunting down local and neighbourhood QRM and also used for long distance purposes. This in turn, may encourage more to resolve their own local issues and get back on the bands and participate. I can but try and keep trying, that is the challenge.

John Martin ZL1GWE, MS Coordinator NZART

NZART EMC Officer Report 2010

Activity

I received one formal complaint of interference during 2010 which unfortunately has not yet been satisfactorily resolved and there is another currently under investigation. I have also had informal discussion with other Hams about their experiences with interference and the changing nature of it.

Pertinent Issues

The principle issue facing us is not so much the increasing levels of interference we are experiencing, particularly on HF, or its changing nature. It is simply what are the authorities willing or able to do about it.

Legally they are not obliged to protect amateur radio activity but there are other approaches we can make to them. During the past year I have given the issue quite a bit of consideration and have also had discussions with Radio Spectrum Management, and I might add they were very amicable.

Future

I intend to pursue the matter in the coming year with the aim of both parties gaining a good understanding of what the issues facing the other is. It is my intention to reach agreement with Radio Spectrum Management on a process to deal with legitimate complaints from the amateur radio fraternity.

Brian Emmett ZL3BE
EMC Officer

CHARTERED ACCOUNTANTS

PARSONS RODDICK & CO, Chartered Accountants

Auditors Report 2010

INDEPENDENT AUDITOR'S REPORT

To: Members of the New Zealand Association of Radio Transmitters Incorporated.

Report on the Financial Statements

We have audited the financial statements of the New Zealand Association of Radio Transmitters Incorporated on page 1 to 8, which comprise the statement of financial position as at 31 December 2010, and the income and expenditure statement for the year then ended, and a summary of significant accounting policies and other explanatory information.

Officers' Responsibility for the Financial Statements

The Officers are responsible for the preparation of financial statements in accordance with generally accepted accounting practice in New Zealand and that give a true and fair view of the matters to which they relate, and for such internal control as the directors determine is necessary to enable the preparation of the financial statements that are free from material misstatement, whether due to fraud or error.

Auditor's Responsibility

Our responsibility is to express an opinion on these financial statements base on our audit. We conducted our audit in accordance with International Standards on Auditing (New Zealand). Those standards require that we comply with ethical requirements and plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgement, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation of financial statements that give a true and fair view of the matters to which they relate in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates, as well as evaluating the presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Other than in our capacity as auditor we have no relationship with, or interests in, the New Zealand Association of Radio Transmitters Incorporated.

Opinion

In our opinion, the financial statements on pages 1 to 8:

- comply with generally accepted accounting practice in New Zealand.
- give a true and fair view of the financial position of the New Zealand Association of Radio Transmitters Incorporated as at 31 December 2010 and its financial performance for the year ended on that date.

Report on Other Legal and Regulatory Requirements

In accordance with the Financial Reporting Act 1993, we report that:

- We have obtained all the information and explanations that we have required.
- In our opinion proper accounting records have been kept by the New Zealand Association of Radio Transmitters Incorporated as far as appears from an examination of those records.

Parsons, Roddick & Co

17 March 2011 UPPER HUTT

Treasurer's Report 2010

I'm pleased to report that for the year ended 31 December 2010, once again, your Association has posted a surplus of income over expenditure (2010 $3691, 2009 $22,692). While the surplus was substantially less than the previous year, this was after the publication of the *Call-Book* in both hard copy and digital format.

Your Association remains in a sound financial position, however there are challenges that need addressing. Falling membership and site access costs are some of those challenges that need addressing if the Association is to remain financially healthy.

During this last year your Council had the opportunity to look at moving HQ to a cheaper location. Some of the computer processing would have needed to be done via the internet. While many businesses now do business this way they also spend significant sums to secure their data from hackers and the like. While your Association membership database and accounting package contains information that is of importance to only yourselves I am reluctant to allow some of that information anywhere near the worldwide web without a very robust firewall.

The future for your Association is in working smarter not harder and may require changes to the way your Association operates if it is to remain viable. I have suggested to your Council that it may be opportune to address the way in which it operates and starts with a Constitution that would allow for charitable status for the Association. This may remove the burden of taxation and open up other fundraising opportunities given the community good that the membership provides.

I look forward to a healthy debate at the Annual General Meeting where I'm sure you will have many questions and suggestions as to how to preserve your wonderful hobby.

Finally I once again congratulate those members of your Association who generously carry out services for members in a voluntary (unpaid) capacity. These members keep your Association alive and viable at least for the present.

Evan T Sayer
Treasurer

15 March 2011

NEW ZEALAND ASSOCIATION OF RADIO TRANSMITTERS Inc
Income and Expenditure for the Year Ended 31 December 2010

2009		Note		2010
	Income			
139,596	Subscriptions	1		130,878
11,859	Interest and Investment Income			10,695
3,059	Donations Received			7,740
7,414	SMART Processing			6,453
396	Examinations	3		262
493	Publications	2		671
162,817	**Total Income**			156,699
	Less Operating Expenses			
57,661	HQ Operating Costs	4	61,040	
1,900	Audit Fee		1,850	
1,342	Beacon & National System Costs		574	
–	Branch Visits		174	
43,848	*Break-In* and *Call-Book*	5	71,849	
13,205	Conference		7,879	
1,984	Contests, Grants and Gifts		954	
2,310	Council Expenses		3,253	
5,613	Election's		–	
4,349	IARU Conference		–	
2,284	IARU Region 3 Contribution		1,778	
–	Legal Expenses		(2,210)	
1,779	Repeater Licence Costs		(589)	
–	Membership Promotion		–	
–	Monitoring Service		–	
32	Officers Expenses not covered elsewhere		1,000	
–	Overseas Travel		964	
1,386	QSL Bureau Costs		1,589	
111	Website		314	
137,804	**Total Expenses**			150,420
25,013	**Excess INCOME over Expenditure for the Year ended 31 December 2010**			6,279
2,321	Taxation Expense			2,588
$22,692	**Excess INCOME over Expenditure transferred to Accumulated Funds**			$3,691

The attached notes form part of, and are to be read in conjunction with, these financial statements.

NEW ZEALAND ASSOCIATION OF RADIO TRANSMITTERS Inc
Statement of Financial Position as at 31 December 2010

2009		Note		2010
	Members Funds			
210,931	Balance as at 1 January 2010			233,624
22,693	Add movements in reserves	13		4,170
233,624				237,793
4,647	Conference Expense Fund			4,647
1,130	Non Sponsored Awards Fund			652
$239,401	**Total Members Accumulated Funds as at 31 December 2010**			$243,092
	These Funds are Represented by :			
	Current Assets			
16,649	Bank of New Zealand–Current Account		11,792	
287,142	Bank of New Zealand–Deposit Accounts	6	300,731	
4,931	Westpac Trust–AREC Imprest Accounts		5,460	
23,402	Westpac Trust–Deposit Account	6	23,847	
157	ANZ Bank–Break-In Imprest Account		99	
5,576	Public Trust–Deposit		5,629	

4,000	Advance to Conference Committees		–	
1,151	Accounts Receivable	7	5,448	
1,585	Bookshop Stock	9	434	
1,144	Provision for Tax	8	854	
1,706	Prepayments		652	
347,442	**Total Current Assets**			**354,945**
	Less Current Liabilities			
13,205	Accounts Payable		11,522	
18,208	AREC Balance held	10	31,376	
112,895	Subscriptions received in Advance	11	114,596	
144,308	**Total Current Liabilities**			**157,494**
203,134	**Working Capital**			**197,451**
36,267	**Fixed Assets (as per Asset Schedule)**	12		**45,641**
$239,401	**Net Assets**			**$243,092**

The attached notes form part of, and are to be read in conjunction with, these financial statements.

NEW ZEALAND ASSOCIATION OF RADIO TRANSMITTERS Inc
Asset and Depreciation Schedule as at 31 December 2010

Asset	Cost 1-Jan-10	Book Value 1-Jan-10	Assets Purchased	Assets Disposed of	Depreciation Charged	Book Value 31-Dec-10
Head Quarters						
Desk & Chair	364	1			-	1
Antenna - DP-CP6	622	167			62	105
Cane Furniture	365	1			1	-
Stacker Chairs	240	1				1
Meeting Table	130	1				1
Pentium 4 Computer	2,160	1			-	1
Dell Pentium Comms PC	465	101			93	8
Uninterupted Power Supplies (2)	150	1			1	-
Compaq Notebook Computer	1,800	570			360	210
Brother Inkjet Computer	120	1				1
Cnet Wireless Router	100	1				1
Computer Software						
Membership	4,445	1			-	1
Leasehold Improvements	1,212	546			121	425
Security Alarm	738	333			74	259
Binding Machine	329	148			33	115
AREC						
ICOM ICF7000 Radios	38,896	34,393			6,033	28,360
ICOM AH4 Tuner			465		68	397
ICOM VHF Handheld Radios			4,470		588	3,882
ICOM VHF Handheld Radios			4,480		524	3,956
ICOM Power Supply			245		29	216
ICOM Tuners & Handhelds			7,396		757	6,639
ICOM VHF Mobile & P'Supply			1,164		102	1,062
	$52,136	**$36,267**	**$18,220**	**$-**	**$8,846**	**$45,641**

NEW ZEALAND ASSOCIATION OF RADIO TRANSMITTERS Inc
Accounting Policies for the year ended 31 December 2010

1 Financial Reporting
The Association qualifies for certain disclosure exemptions under the New Zealand Institute of Chartered Accountants Framework for Differential Reporting because it is not publicly accountable and size (as defined in the Framework). The New Zealand Association of Radio Transmitters Inc has taken advantage of all financial reporting exemptions.

2 Measurement Base
The Accounting principles recognised as appropriate for the measurement and reporting of earnings and financial position on a historical cost basis have been followed by the Association.

3 GST Basis
These financial statements have been prepared on a GST exclusive basis.

4 Changes in Accounting Policy
There have been no changes in accounting policies. All policies have been applied on bases consistent with those used in previous years.

NEW ZEALAND ASSOCIATION OF RADIO TRANSMITTERS Inc
Financial Notes for the Year Ended 31 December 2010

2009			2010
Note			
1 Subscriptions			
151,555	Gross Subscription Received		142,250
(11,959)	Less rebates taken		(11,372)
$139,596	**Net Income from Subscriptions**		**$130,878**
2 Publications			
2,724	Total Sales		1,978
2,080	Stock on Hand 1 January 2010	1,585	
1,735	Add Purchases	157	
3,816		1,741	
1,585	Less Stock on hand – 31 December 2010	434	
2,231	Cost of Sales		1,307
$493	**Excess Income over Expenditure**		**$671**
3 Examinations			
396	Income		262
–	Less Costs Incurred		–
$396	Net Income from Examinations		$262
4 Head Quarters Operating Costs			
133	ACC Levy		192
1,542	Bank Charges		1,493
–	Business Managers Expenses		–
–	Business Management Committee Expenses		–
240	Computer Repairs & Maintenance		–
–	Computer Software Support		–
829	Depreciation		745
266	General Expenses		436
2,476	Insurance		2,586
708	Internet & Email		629
188	Office Expenses		456
3,478	Photocopying		4,219
2,138	Postages & Couriers		3,535
1,692	Printing & Stationery		1,966
7,990	Rent		8,022
–	Repairs & Maintenance		–
34,312	Salaries		35,106
273	Security		299
1,394	Telephone & Fax		1,357
$57,661			**$61,040**

5 *Break-In* and *Call-Book*

	Expenses	
5,886	Editorial Fees and Expenses	6,295
46,466	Typesetting, Printing and Distribution	49,943
–	*Call-Book*	21,809
52,352		**78,047**
	Less Recoveries	
8,504	Advertising & Sales	6,198
$43,848	**Net Cost of Providing *Break-In* and *Call-Book***	**$71,849**

6 Bank Deposits

	Term	Matures	Interest Rate
BNZ–Achiever Savings Account	On Call		1.00%
BNZ–Deposit Account – 3009	149 days	27-May-11	3.45 %
BNZ–Deposit Account – 3011	150 days	26-Mar-11	5.15 %
BNZ–Deposit Account – 3012	364 days	11-May-11	3.35 %
BNZ–Deposit Account – 3015	180 days	6-Mar-11	4.05 %
BNZ – Deposit Account – 3017	90 days	30-Mar-11	3.45 %
Westpac Trust – Deposit No. 1001	180 days	16-Feb-11	5.10 %

7 Accounts Receivable

The Balance of the Accounts Receivable is considered to be totally collectable.
There is no Provision for Doubtful Debts

8 Provision for Taxation

	Taxation was provided on Interest and Dividend Income.	
9,673	Income Assessable for Taxation	**8,625**
2,902	Taxation at $0.30	2,588
(581)	Less Taxation overprovided in Previous Years	
2,321	Tax Expense	**2,588**
(4,043)	Less Resident withholding Tax Already Deducted	(3,441)
579	Add Provision for Previous Year	–
$(1,144)	Provision for Taxation at 31 December 2009 (– Refund)	**$(854)**

9 Bookshop Stock

Stock on hand as at 31 December 2010 was valued at cost.

10 AREC

8,774	**Balance as at 1 January 2010**			18,208
–	add Police Grant			10,000
19,500	NZART AREC Emergency Funds Trust			19,500
153	Sales (Jerkins & Manuals)			
28,427	**Total Resources**			**47,708**
	Less AREC Expenses			
650	Administration	650		
343	Conference			
4,503	Depreciation	8,101		
800	Equipment Subsidies	1,601		
742	Insurance Subsidies	1,867		
192	Other Costs	1,528		
–	Printing & Stationery			
1,037	Training Costs	2,510		
–	Travel			
1,951	Vehicle Registration Subsidies	76		
10,218				**16,332**
$18,208	**Balance as at 31 December 2010**			**$31,376**

11 Subscriptions in Advance

1672 of the 1903 members had paid their subscriptions for 2011 prior to 31 December 2010.
A substantial number of these also availed themselves of the early payment rebate.
The amount of Subscriptions in Advance is made up as follows :

2009		2010
118,181	Gross Subscription for the **2011** Financial Year	123,852
(11,372)	Less rebate	(17,803)
$105,360		**106,049**
$6,086	Members Credit Balances as at 31 Dec 2010	**$8,547**
$112,895	**Total Subscriptions received in advance**	**$114,596**
	NB. These figures are exclusive of GST.	

12 Fixed Assets and Depreciation

The Inland Revenue Department now allows for the purchase of assets with a value of less than $500.00 to be expensed in the year of purchase.The Association has taken advantage of this concession but reduces the value of the asset to $1.00 while that asset is utilised within the Association.

Depreciation has been charges at the rate approved by The Inland Revenue Department for Taxation purposes. The straight line method based on the assessed remaining economic life of all the items estimated at:

Printers	10 years
Office Chairs	10 years
Brother Printer	10 years
Fascimile	5 years
Computer Hardware	5 years
Computer Software	3 years
Leasehold Improvements	10 years
Radios (AREC)	5.7 years

See schedule of Assets and Depreciation for specific details.

13 Movement in Members Funds

2009		2010
210,931	**Balance as at 1 January 2009**	233,624
22,693	Add Excess Income over Expenditure	3,691
233,624	**Total Resources**	**237,315**
–	Less Allocated to Specific Funds (Non Sponsored Awards)	(478)
$233,624	**Balance as at 31 December 2010**	**$236,837**

MEMO to *Break-In* contributors

CDs:

Nowadays many contributors are sending me graphics and photos, etc on CD and this is much appreciated. At present the cost of a CD is less than the postage costs so, unless requested otherwise, they will not be returned. Please let me know asap if I still have a CD or photo that you would like returned and I will action. Thanks, *John ZL3IB Editor*

WANTED: copy for Break-In

My stock of articles etc for future issues is running low so I appeal to members to assist with material for publication. This could be short or long articles on any topic related to amateur radio and electronics, constructional articles, book reviews, equipment reviews, software reviews, branch activity reports, etc.
I should also like to receive articles on electronics related topics such as auto-electronics, home sound systems, workshop practice; in fact anything that hams might find of interest. Thanks and 73, *John R L Walker ZL3IB (Editor)*
Email <zl2tw@nzart.org.nz>

Copyright

The contents of this publication are copyright and may not be reproduced without prior consent except by bona-fide amateur radio organisations which may reproduce them provided that the author and Break-In are acknowledged.

Break-In, on behalf of NZART, owns all copyright and all other intellectual property rights for all material printed in this magazine, unless stated otherwise.

Everything printed in this magazine is copyrighted. We advise that you may not copy or display for redistribution to third parties, or for commercial purposes, any portion of Break-In without the editor's expressed permission.

Remits

Remit 1 **Transmitting** ***Napier Branch 25***

Add the following as clause 7.1d to the NZART Constitution. The Executive Council may delete a branch from the register of Branches if that Branch makes or has made one or more changes to its constitution either without the prior approval of the Executive Council or which means it is inconsistent with this constitution.

Explanation:

Clause 7.3a. of the Constitution makes it clear a branch must have a constitution which is approved by Council and which must not be inconsistent with the NZART constitution. This amendment makes it clear that should any subsequent changes be made by a Branch to its constitution then it must continue to comply with these obligations or be removed from the branch register.

Remit 2 **Transmitting** ***HBARC Branch 13***

That the constitution be amended by adding a new clause 3.9 d as follows:

d. Where any member of the Executive Council is removed from office pursuant to this clause 3.9 they shall not be eligible to stand for election as President or for the Executive Council or to be appointed as an Officer of the Association for a period of seven years from the date they are removed.

Explanation: *Currently if a member of Council is removed from office by the members of NZART there is no provision in the Constitution to stop that person immediately standing again. We believe that any person removed in this manner should not be eligible for re-election or appointment as an officer for seven years.*

Remit 3 **Transmitting** ***HBARC Branch 13***

That the constitution be amended by adding a new clause 3.11 as follows:

3.11 Disclosure of Interest

Where a person elected to the Executive Council is, or subsequently becomes, a member or representative of another organisation (other than a branch of the Association), which has similar objects to the Association or which is active in Amateur Radio, that person must immediately disclose that interest to the Executive Council and that disclosure shall be recorded in the minutes of the next meeting of the Executive Council.

Remit 4 **Transmitting** ***HBARC Branch 13***

That the constitution be amended by adding a new clause 4.9 to provide as follows:

4.9 Disclosure of Interest

Where a person appointed an Officer or deputy Officer of the Association is, or subsequently becomes, a member or representative of another organisation (other than a branch of the Association), which has similar objects to the Association or which is active in Amateur Radio, that person must immediately disclose that interest to the Executive Council and that disclosure shall be recorded in the minutes of the next meeting of the Executive Council.

Explanatory notes for Remits 3 and 4:

These amendments are aimed to ensure open and transparent governance of NZART and help avoid any possible conflict of interest by requiring members of Council and NZART Officers to disclose any interest they may have in another amateur radio organisation.

Remit 5 **Transmitting** ***HBARC Branch 13***

That the constitution be amended by adding a new clause 3.12 to provide as follows:

3.12 Actions of Executive Council Members

That the members of the Executive Council must at all times act in good faith and in the best interests of the Association.

Council Comment:

This matter is already covered in the NZART Constitution, Clause 2.8 "Obligations of Members".

Remit 6 **Transmitting** ***HBARC Branch 13***

That the constitution be amended by adding a new clause 4.10 to provide as follows:

4.10 Actions of Officers

That Officers and deputy Officers must at all times act in good faith and in the best interests of the Association.

Explanatory Note for Remits 5 and 6:

When elected or appointed as the case may be, NZART members are entitled to assume that those people will act in an open and honest manner and in NZART's best interests. Although conventional wisdom would suggest this is the case anyway, currently there are no specific provisions in the Incorporated Societies Act 1908 which provide for this. Accordingly these amendments would avoid any doubt as to the standards NZART members expect their elected and appointed representatives to meet when acting on their behalf.

Council Comment:

This matter is already covered in the NZART Constitution, Clause 2.8 "Obligations of Members".

Remit 7 **Transmitting** ***HBARC Branch 13***

That NZART negotiate with RSM to amend the Radiocommunications Regulations to increase the amateur transmitter power output limit to 1000 watts peak envelope power on the following amateur bands: 80 metres, 40 metres, 20 metres, 17 metres, 15 metres, 12 metres, 10 metres and 2 metres. Other bands would remain at the existing 500 watt limit.

Explanation:

ZL is one of the most remote territories on the planet in amateur radio terms. There are many ZL amateurs whose main interest is DXing, contesting, or who are interested in weak signal work such as EME, moonbounce and meteor scatter techniques and contacts. An increase in power would assist their efforts and help keep ZL amateurs internationally renowned and competitive.

Such an increase would bring us into line with progressive administrations in other countries such as the United States, Canada and many other countries in the EU. An increase in power from 500 to 1000W would have little or no impact on the New Zealand Standard for Radiated Emissions. Modern amplifiers operate cleanly with little or no interference to the rest of the spectrum and would have no impact on digital TV. We would not expect a rise in interference complaints and there has been no evidence of widespread issues in countries where 1000W or more is allowed.

Remit 8 **Transmitting** ***Wellington VHF Group Branch 74***

That Schedule A Clause 1b of the NZART Constitution be rescinded and replaced with the following:

"Every nomination to an elective position in the Association must be made by resolution of a general meeting of a branch of the Association and must be submitted in writing and

must be signed by two officers of the nominating branch and must be countersigned by the member nominated. The nomination must also contain a copy of the minutes of the branch showing the resolution of nomination and a certificate signed by all three persons stating that the candidate is an Active Amateur."

Explanation:

Currently a person wishing to become a Councillor only needs to convince two members of NZART (who could even be members of the potential Councillor's family) to nominate and second them.

Under this remit, a potential Councillor would have to convince an NZART Branch of their qualities for the nomination to proceed. This remit would bring nomination for Council into line with other processes used by NZART such as the appointment of examiners and applications for repeater licences, all of which require support by a Branch.

Remit 9 **Non Transmitting** ***Marton & Districts Branch 23***

That the "Amateur Repeater Trustees Association of New Zealand (Inc)", (ARTANZ (Inc)) be admitted as an affiliated member of NZART (Inc) under clause 7.4 of the Association's constitution.

Explanation:

ARTANZ (Inc) has as its objectives and aims in its constitution, similar goals as does NZART and if their endeavours succeed it can only be an asset to the Association to have them as associates of NZART. This must surely be a win/win for NZART to have an affiliated organisation that in essence will be a funding organisation to support the repeater infrastructure that all Amateurs now enjoy. This will help secure the future of this asset for future Amateurs of New Zealand.

Remit 10 **Non-Transmitting** ***Members' Remit***

(Clause 6.6 b ii NZART Constitution)

We the undersigned members of NZART (Inc), forward the remit below for consideration at the 2011 NZART AGM, or prior adoption by the Association's Council.

Remit: That NZART endorses the establishment of ARTANZ (Incorporated), commends its objects and notes that ARTANZ is fully supportive of NZART in all respects.

Explanation:

There is a void in the representation of repeater owners' interest to other parties. NZART policy is now to remain neutral in repeater issues such as site tenancy and rentals. ARTANZ recognises the past contributions of NZART, understands that the issues of repeater arrangements are not a matter for NZART, and looks forward to solving the issues presently facing many repeater owners. As a registered charity ARTANZ will have access to funding options not available to NZART. As a separate organisation ARTANZ can access all New Zealand amateurs, not just NZART members.

M Newman ZL1BNB, Boyle ZL2BGE, C Kerr ZL2LO, J F Howe ZL2THO, L Horn ZL2ATU.

Remit 11 **Transmitting** ***Members' Remit***

That NZART negotiate with RSM to allow amateurs to use a ZK prefix replacing their current ZL prefix for AREC events and emergency use while retaining their current suffix as follows: ZK1 for ZL1, ZK8 for ZL2, ZK9 for ZL3, ZK4 for ZL4.

Explanation:

With the current system ZK#Exx call-signs are issued by a Section Leader before an event. Apart from the time it takes, this causes incredible confusion for the operators. By simply changing the prefix, everyone will immediately know their call-sign and it will be easy to identify the operator. Furthermore as most ZK#Exx calls are not in the RSM database, it will provide a method to check to see if the ZL call is validly issued and accordingly will not require a separate ZK database.

For example: ZL1ABC would become ZK1ABC, ZL2CDE would become ZK8CDE, ZL3FGH would become ZK9FGH, ZL4IJK would become ZK4IJK.

Moved by Mike ZL3TMB; supported by Mike ZL3MJS, Mark ZL3AB, Vee ZL3TVS, Eion ZL3AG, Blair ZL3TOY, David ZL3AI.

Remit 12 **Transmitting** ***Members' Remit***

If remit 11 is successful ZK#"E" call-signs be phased out over the next year.

Explanation:

This will ensure that the old legacy system, kept from the ZL#Exx call-signs is stopped once and for all, as there would be no need for "E" calls at all. Club call-signs could be used as base call-signs.

Moved by Mike ZL3TMB; supported by Mike ZL3MJS, Mark ZL3AB, Vee ZL3TVS, Eion ZL3AG, Blair ZL3TOY, David ZL3AI.

Remit 13 **Transmitting** ***Manawatu Branch 20***

That Council establishes the process to permit recognition of qualifications in electronics as contributory to gaining a General Licence in the same was as every University and Polytechnic has a process to recognise relevant existing qualifications held by new students.

Explanation:

There are dozens of potential amateurs in the community who hold professional qualifications in electronics but are deterred by the process of having to re-sit an examination on a topic they have already passed. One action that NZART can take to increase membership is to remove any barriers or impeding factors to such prospective members. In this case the barrier is the License examination for those who already hold comparable qualifications. Re-sitting an exam having already attained the requisite academic level is a significant psychological deterrent. It is a complete myth that those who have already reached the required standard do not mind sitting an exam again. They do mind, and in our case proceed to look for other avenues to exercise their interests.

Every university and polytechnic in New Zealand has the process of granting "Recognition of Prior Learning" (RPL) to enable those with comparable (note comparable not identical) qualifications to be given exemptions from appropriate parts of an examination or course of training. In our case it would most likely be just the electronics section of the General Licence exam. It is highly unlikely that the 'regulations' part would ever be exempted.

Older hams may recall that years ago "Cross-crediting" as it was called was granted to those with "Post Office" or "Military" type qualifications. RPL is simply a refinement of the same idea.

Process

Applicants seeking recognition would first apply to the local examiner who would send the supporting documents to ARX. The latter would print an exam paper, with just the non-exempted sections(s) and this is sent directly to the local examiner. A nominal fee could be set for the recognition process.

Establishing a list of recognised qualifications is relatively simple. The NZQA exams are already available as a base line and for others one simply waits for applicants to request recognition.

Council Comment

A process to permit recognition of qualifications in electronics already exists. A candidate should contact an ARX who will be able to assist.

NZART Conference 2011
Queen's Birthday Weekend
3-6 June 2011

Upper Hutt Branch 63 NZART cordially invites NZART Members and their guests to join us at the Upper Hutt NZART Conference 2011.

Venue

This year's Conference is being held at the Silverstream Retreat which is located near the Upper Hutt suburb of Silverstream and just north of the entrance to Stokes Valley. It is easily accessible from the nearby State Highway 2 and State Highway 58 (Hayward's Hill Road). Physical address is: Corner Eastern Hutt Rd & Reynolds Bach Drive, Lower Hutt 5019. Free Internet access on site via Wi-Fi will be available.

Provisional programme

The programme will include lectures and forums by several guest speakers, the NZART AGM plus the usual AREC, AMSAT-ZL, OTC, SPAM, WARO and other section meetings, forums and AGMs. An exciting range of other talks, displays and trading tables has been organised.

Guest Speakers

The Conference is planning for an opening address from local Member of Parliament, Chris Hipkins, as well as the Conference Chairman.

Friday

Registrations will commence on Friday afternoon from 4.00 pm at the Silverstream Retreat, from the Boardwalk complex. For those staying on site, all registration and accommodation will be handled by the Conference Registration team.

Saturday

The registration desk will be open from 7.30am at the Boardwalk area, again for all registration and accommodation inquiries and requests. The Conference will commence at 8.30am, with the official opening commencing at 9.00am. After the welcoming speeches there will be a morning tea break at 9.30am for 30 minutes, with the conference re-commencing at 10.00am. The Alternative Programme will commence after the morning tea break. The day should end around 5.00pm with enough time to go back to your accommodation before 6.00pm before pre-dinner drinks at the Boardwalk. Then at 7.00pm the Conference Dinner will commence. The after dinner speaker is well known broadcaster Ian Johnstone. Entertainment will follow.

Sunday

At 8.30am the WARO AGM will start with other AGM's and forums at 9.00 am. The day should end again around 5.00pm for members to refresh before 6.00 pm for pre-dinner drinks at the Boardwalk. At 7.00pm comes the closing dinner.

For more information, please contact email: uh.conference2011@gmail.com. Post: UH Conference 2011, 204 Plateau Road, Te Marua, Upper Hutt 5018, Wellington.

NZART Conference 2011
Registration Form
Queen's Birthday Weekend 3-6 June 2011

*** Please note, only ONE registration form per person ***

First Name: Last Name:

NZART membership Number: Call-sign: Handle for Name Tag:

Full Weekend (Saturday and Sunday - excludes accommodation)

A – Amateur Programme – includes teas, lunch, dinner and entertainment	$205.00	☐
B – Alternative Programme – includes transport, teas, lunch, dinner and entertainment	$205.00	☐

Below is for those who do not wish to pay for the whole weekend but to choose selected programmes.

Saturday only:

C – Amateur Programme – teas (morning and afternoon) and lunch	$40.00	☐
D – NZART AGM 2011 – no morning or afternoon tea, or lunch	FREE	☐
E – Alternative Programme - teas (morning and afternoon) and lunch	$60.00	☐
F – Evening Programme – includes dinner and entertainment	$65.00	☐

Sunday only:

G – Amateur Programme – teas (morning and afternoon) and lunch	$40.00	☐
H – Alternative Programme - teas (morning and afternoon) and lunch	$75.00	☐
I – Evening Programme – includes dinner and entertainment	$65.00	☐

On-site Accommodation
All accommodation is *per person; per night,* eg. three nights in Stonewall Lodge is $165.00.

J – Motel styled accommodation Friday/Saturday/Sunday nights
$370.00 per night (studio unit requires 2 x couples per unit) ☐

K – Twin Share (Stonewall Lodge) accommodation Friday/Saturday/Sunday nights
$55.00/night per person = $165.00 (suitable for single or couples) ☐

L – Bunkroom (Rimu Court) accommodation Friday/Saturday/Sunday nights
$45.00/night per person = $135.00 (for the budget traveller, bunkrooms house 3, 4 or 6 beds) ☐

If payment is made after 9 May 2011, add $25.00 for late registration

Total Payment $ _____

Breakfast is included in all accommodation options. All accommodation will be allocated on a first come, first served basis until all accommodation is assigned. If you require less than three nights' accommodation please make contact first with your requirements prior to sending in payment, as additional accommodation booking/planning is required for those not staying for the full weekend.

Email contact: uh.conference2011@gmail.com

Please post your Registration Form with payment to:
UH Conference 2011, 204 Plateau Road, Te Marua,
Upper Hutt 5018, Wellington

For payment via Internet Banking:
Bank: Westpac Branch: Upper Hutt A/C Name: UH Conference 2011, Account Number: 03-0774-0897536-00

For payment via Internet Banking, you must complete a Registration Form and email details of the deposit so that the registration form and deposit can be matched.

The Morseman

Gary Bold ZL1AN
<Morseman@nzart.org.nz>

An even simpler audio oscillator

Peter, ZL2LF, emailed this: "Hello Gary, This might beat the CW oscillator that you describe in the January *Break-In* as far as component count is concerned.

"This CW oscillator, constructed for our *"Ham Radio Day Out"* uses only three components including the piezo speaker. The circuit was modified from a CMOS data book. I used a CD4069 chip, a capacitor and a 1.5 MΩ pot as the frequency determining elements. The pot varies the frequency from about 450 to 2300 Hz. The switch to the battery was the Morse key and the speaker came from an old telephone. The 9 volt battery was second hand from a smoke alarm. All mounted in a surplus PC speaker. I like cheap!

"Lee ZL2AL and I demonstrated the use of CW to several young (and not so young) members of the public who were very interested. I asked the young folk what sound their cellphones made when they received a TXT message and when they had finished making "SMS" sounds, informed them that they already knew some CW! Don't you just love the look on their faces as the light dawns!"

See figure 1; Peter's circuit uses 3 of the 6 gates in a CMOS HEX inverter, and yes, it does use one fewer component than the 555 circuit I gave last month. The unused inputs (pins 9, 11 and 13) should be grounded. The right-hand chip is just a buffer to isolate the speaker from the two frequency determining gates. Because of the lower drive capability of CMOS inverters, you can't use a moving-coil speaker here as you can in my 555 circuit.

This circuit also produces a square wave tone, and the loudest response of piezo speakers is typically at a higher frequency than is comfortable for Morse practice. The linear circuit given as last month's problem (see below) produces a good sine-wave, more typical of CW signals you'd hear on the receiver.

How good is your filter?

CW Hams, especially DX operators, have always been interested in the pass-band response of their CW filters. If you look on the web, you'll find a wealth of comment on both commercial and home-brew designs to implement pass-bands narrower than the 3 kHz or so considered acceptable for SSB. There is no doubt that a narrower filter works better, see the comments from Fred W5YI in the November/December column last year. Fred is unusual, in that he can't actually *hear* higher frequencies because of hearing loss. He thus has a built-in "bionic" filter, which, in his military days, enabled him to copy noisy signals more accurately than other operators.

Fred used this ability to advantage in the Korean war, when receiver's CW filters were more rudimentary than they are today. I've described a variety of easily-constructed op-amp audio filters in this column over the years, but now much better designs are

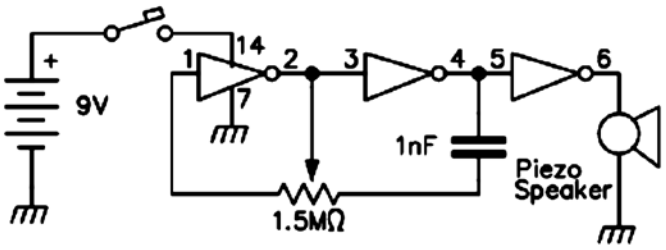


Figure 1. Peter's simple Morse practice audio oscillator.

available, the excellent DSP ones included in some modern rigs. For an older receiver, you can also purchase add-on DSP units off the shelf. As an added advantage, many of these include adaptive noise canceling, which attempts, often with astonishing success, to remove statistically stationary random noise. For comments on these, look up the *Eham Reviews* on the web.

So with state-of-the-art equipment you can now dial up almost any response you like. But with this freedom comes more questions: How narrow can a filter be before unacceptable "ringing" occurs? What is the "best" centre-frequency for listening? How good is *my* filter? How can I *look at* the response of my filter?

New passband-inspection software

Measuring the response of filters in-situ is tricky but in 1997, Paul Kellett wrote a very useful set of sound-card programs which he distributed in a file called *"Wavetool.zip"*. One of these, *"Analyser"*, provided a very simple method for examining the pass-band shape of receivers and any in-line filters, and I have recommended it several times over the years, to use in conjunction with my *Delphi* program *"Plotspec"*. Download sites for both of these are given on my web-page[1].

But Paul wrote *Analyser* in an old version of *Visual Basic* for *Windows 3.1,* and it won't run on the 64-bit versions of *Windows 7,* which many people are now using. Paul has no plans to re-write it, so I asked Con ZL2AFP to look at it and see if he could produce something similar. He did, and he has, with several additional features. It's written in *Power Basic,* and the executable file is surprisingly small, a bit over 100 kB, requiring no additional DLL or other files.

The operating window of Con's program, *"Spectrum Analyzer"*, is shown in figure 2. The plot shows the LSB pass-band of my FT-767GX receiver, obtained by averaging the audio spectrum straight from the phone jack. All you have to do is to run the receiver audio (I use the phone jack) into the "line input" of the PC's sound-card, tune to a portion of the band receiving only noise, adjust the volume for a display with reasonable SNR, and let the software average many spectra, which are computed from the magnitude of consecutive 1024 point FFTs. The right-hand slider shown selects the number to be averaged. As you move this slider up, the spectrum shown slowly becomes smoother. Since noise spectra are statistically very variable, you have to average several hundred for a smooth curve. The one shown resulted from an average over several minutes.

The plot graticule is calibrated

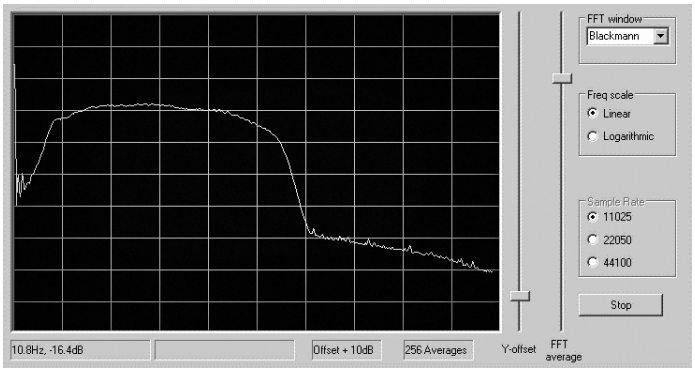


Figure 2. Operating Window of Con's "Spectrum Analyser".

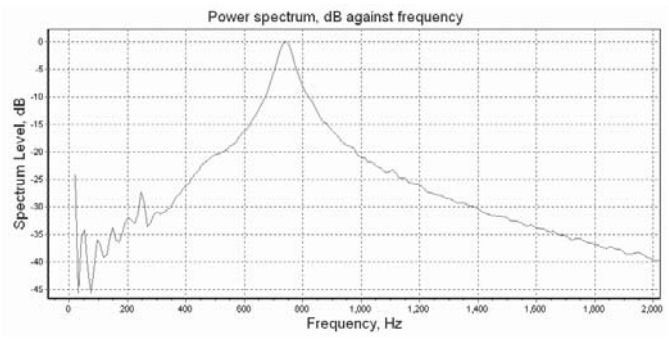


Figure 3: Pass-band shape of single-capacitor band-pass filter.

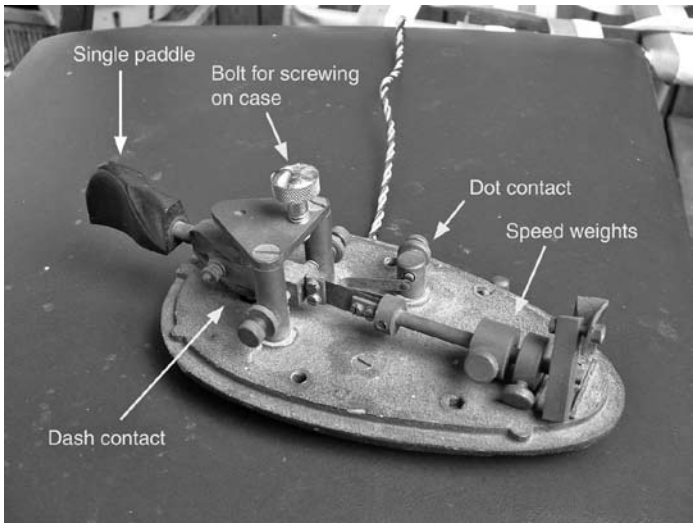


Figure 4: The Eddystone bug with case removed.

in 10 dB steps vertically, and at the default sampling rate, 44 100 Hz, about 2.24 Hz horizontally, displaying the spectrum up to about 22 kHz. For the plot shown, I selected the lowest, 11 025 Hz sampling frequency, when the spectrum range is reduced to about 5590 Hz, and the resolution is about 10 Hz between estimation frequencies. Moving a cursor over the display with the mouse displays the plot frequency and relative spectral level, in dB.

You can move the plot position vertically with the "Y-offset" slider, choose either "Linear" or "Logarithmic" frequency axes, and select one of six different spectral-shaping windows, the default, shown is "Blackman". This doesn't make much difference. Since the audio you're analysing also contains noise generated in the audio stages after the filter, the noise floor you see doesn't truly reflect the filter's skirt shape, which will go down much lower if it's an IF filter. But it does reflect "what you hear" from the receiver.

Figure 3 shows the pass-band of the "single capacitor band-pass filter" I've been discussing in the last two columns, obtained with this program, and then processed with *"Plotspec"*. You can see that this is much smoother than the one obtained using Paul's *"Analyser"* shown in the last column, because the frequency resolution of Con's program sampling at 11 025 Hz is four times higher.

Download this program from my web-page and check the CW filter shape of *your* receiver. We have found in the past that this can vary quite a bit, even between different receivers of the same make and model. But read the help file carefully first, to make sure that you "select" and "mute" appropriate sound-card inputs and outputs.

Next month, I'll describe a real-time, variable bandwidth, DSP filter which Con has also implemented.

The Eddystone Bug

A reader asked "I am told that Eddystone once made a bug key. Do you know anything about it?"

Indeed I do, in fact I own one. See the photograph in figure 4, with the case removed. There's a video of one operating on *YouTube*[2].

This is one of the only two bug keys ever produced in significant numbers in Britain, the other being the *Martin Autoplex*. Eddystone made wonderful receivers, but this key, first produced in 1948, was not a success. Only about 250 were ever made, and not all were sold. They were discontinued about a year later. Its best feature was its very sturdy construction. It was heavy, with a solid die-cast housing.

It's poorest feature was the damper. This is the mechanism that dissipates the remaining vibrational energy of the leaf and weights when the paddle is released after forming dots. This damper was just a rubber grommet, which had perceptible bounce. This didn't completely damp the leaf movement, causing slight but annoying timing glitches in following characters, because the vibrating shaft was not brought to a complete stop after a string of dots. I modified mine after a few weeks by removing this damper and replacing it with a lossy aluminium pendulum modelled roughly on those fitted to the American *Vibroplex* bugs. This worked, I thought, much better. It's that strange, Mickey Mouse contraption at the end of the arm at the right.

The other non-standard feature was the single paddle handle. The best bugs have two paddle levers, one each for the dot and dash. This means that after completing a dot-stream and starting a dash, the dot mechanism remains stationary against the damper, dissipating its energy more efficiently. Such bugs also have paddles of different shapes, with the dash paddle extending further to compensate for the shorter human thumb.

But I found that when I disabled the dot vibrator and used only the contacts, it made a quite acceptable single-lever electronic keyer paddle, and I used this for some years to operate the first digital keyer I designed, the *Zeekey*[3], until in 1977 I purchased the excellent Brown Brothers paddle.

If you come across one of these Eddystone models, it's now a collectors' item due to its rarity.

Last month's problem

Figure 5(a) shows the schematic. The first stage, since feedback is to the non-inverting input, is a Schmitt trigger, the second is an inverting integrator. Thus it combines both a linear and a non-linear stage, and cannot be analysed by invoking the linear oscillation condition $A\beta=1$. With resistance values shown, the Schmitt trigger changes its output state when its upward/downward going input voltage crosses plus or minus $2\ V_s / 3$, where V_s is the magnitude of the maximum or minimum output saturation voltage of the op-amps.

The trick is to start with the output voltage of the second, integrator stage, at one of these thresholds, and find the elapsed time taken to cross to the other. This will be half the waveform period. Since the output voltage of the Schmitt trigger is either plus or minus V_s, the output of the Schmitt will be a square wave, and that of the integrator the time-integral of this, a triangle wave. Knowing the time constant of the integrator, R_3C, we can find the rate at which its output voltage changes, and thus the half period. The corresponding frequency is found to be

$$f = R_2/(4R_1R_3C) = 375 \text{ Hz}.$$

The only correct solution, complete with LTspice simulation, came from Ron, ZL4AI. I've uploaded my explanation of its operation to my web-page.

A more sophisticated version of this circuit is used to generate the

continued on page 38

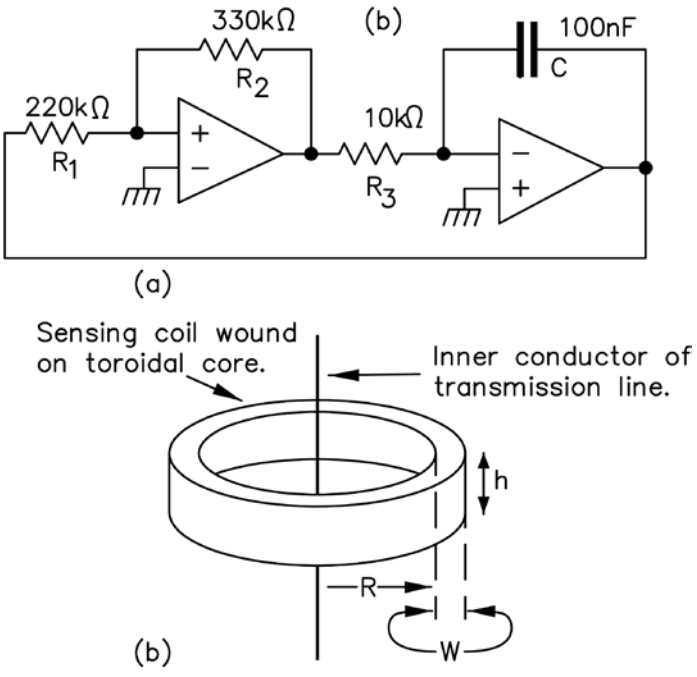


Figure 5: (a) Last month's problem, (b) This month's problem.

"DX" WITHOUT "TX"

For over 60 years, the NZRDXL has catered for the interests of DX listeners in New Zealand.

From Radio Bangui in the steamy jungles of Africa, to the haunting Andean music of Radio Huancayo, to the ever-accurate news from BBC, radio still delivers an important message.

And our monthly magazine The DX Times will tell you what's on the bands and where and when to find your DX-targets.

Whether you're a die-hard DXer, a news junkie, a stickie-beaker, or looking for an alternative to TV and the internet, you'll find people with common interests in the NZRDXL. All for as little as $20 per year.

For more information please visit **www.radiodx.com** where you can download a sample DX Times or request an info-pack from:
NZRDXL, PO Box 39-956, Howick, Manukau

◂ *continued from page 37*

triangle wave input required for the non-linear op-amp sine-wave synthesizer used in some modern signal generators such as those made by *Wavetek*. I explained this in detail in my September/October 2007 column.

This month's problem

Figure 5(b) shows the toroidal "transformer" used in directional coupler versions of an SWR bridge. The primary winding is the single wire running through the toroid, the secondary is wound with equal-spaced turns around the toroid. A diagram of the complete coupler, and an explanation of how it works, can be downloaded from my website[4].

The mutual inductance between primary and secondary is found using Faraday's Law, with a straightforward integration[5]. But since it requires calculus, only geeks should attempt this. Questions:

- How can the primary wire shown be a "winding"? (A "winding" must be a closed loop, but this is just a single wire.)
- The wire is always shown threading through the exact centre of the toroid. Will it still work if it goes through off-centre? How will the mutual inductance change if this wire is off-centre?

These questions can be answered with thought experiments after pondering what Faraday's Law actually says. Don't try the second question analytically. You'll go mad.

References

[1] My web-page is at <http://www.qsl.net/zl1an/index.html>.

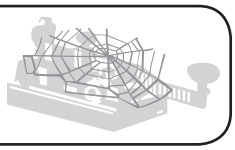
[2] See the Eddystone bug video at <http://www.youtube.com/watch?v=egUo0UyZ7ww>.

[3] Read original *Zeekey* article in *Break-In,* August 1973, page 312.

[4] Download from the link *The Bruene Directional Coupler and Transmission Lines*.

[5] Mutual inductance derivation at <http://physweb.bgu.ac.il/SUBMISSIONS/Physics2_physics/OLD/e_48_2_003_s_037706835.pdf>.

Silent Keys



The Association deeply regrets to record the death of the following members and extends its sympathy to the bereaved.

Silent Keys: guidelines to contributors
Contributors are requested to limit their obituaries to between 200-400 words. Content should focus mainly on the amateur radio activities of the deceased. Normally photographs cannot be included.

James Albert (Bert) Cheyne ZL2AQI

With sadness we record the passing of a well known Manawatu Radio Amateur at the age of 96 after a short illness. Bert was born in Dunedin on 7 December 1914 and later worked for his father on farms through the depression years moving to the Woodville district; later marrying to venture out on his own in the Manawatu. From an early age his father said a boy should have hobby; he tried guitar and music, but it soon gave away in favour of radio which was to be his life long interest and career.

Bert enlisted in 1939 with the Air Force as a radio mechanic, serving overseas as a radio operator for the duration until demobilisation in 1946. He later rejoined post war and served in the RNZAF at Ohakea as a sergeant. He was part of a team that maintained the transmitting station, not far from the Ohakea base, that was also the home of ZKF (Morse training transmissions). He gained his Amateur license in 1951.

Bert will be remembered by older Branch 20 members and many other amateurs as an enthusiastic home constructor of well-designed home built equipment. A four part article of his appeared in *Break-In* 1962-1963 describing a complete portable station and this gear is still owned locally and fully operational. Bert remained fully alert with an amazing memory for things past and present to the end of his life.

We extend to his immediate family of three daughters, Annette, Larraine and Suzanne and their families our deepest sympathy at their loss.

Bryan Anderson ZL2AFT

REMEMBER:
Leave a three second pause between overs when using repeaters. Someone else may have an urgent message.

Lee Allan ZL3PK

Lee's interest in amateur radio began in the 1960's while he was teaching at Millerton School on the West Coast. He joined the local branch 49 and obtained his call ZL3SP. His setup, at the time, was an 80 m dipole on 40 ft masts 1000 ft above sea level and a ZC1. This enabled him to make contacts New Zealand wide and even over to Australia. Not bad on 5 watts AM. Many of the ham fraternity at the time became lifelong friends.

His enthusiasm for the hobby was contagious. He used to help budding amateurs with their Morse code practice at our QTH. The ham shack was always in our living room which meant the family was exposed to on-air contacts from an early age. I passed the test becoming ZL3AAZ, and eventually, the other four children as well. Over time two of their spouses and two grandchildren (so far) have also become hams.

A move to the east coast and some homebrew rigs before going on to Wellington where his call changed to ZL2PK. Activities still stayed on 80 m, which was a convenient way to keep in touch as the family grew up, married and left home. He retired to Rangiora becoming ZL3PK and still active on 80. Lee became a foundation member of the Canterbury Amateur Radio Development Society as well as a long time member of Branch 68. Failing eyesight restricted his radio activities in the last few years although he was able to keep in touch with friends via 2m and always listened to the Sunday night regional and national nets.

At his funeral on 4 February, tribute was paid to his many talents and interests. Lee will be remembered for the way he gave others the confidence to pursue their dreams and achieve their goals.

Lorna Allan ZL3AAZ

Satellite Orbits

Andrew Barron ZL3DW
<ad.barron@xtra.co.nz>

About the time you receive this *Break-In* there should be an opportunity to listen to the ARISSat-1 satellite which is scheduled to be activated aboard the ISS on 12 April. The ARISSat-1 satellite, presently still inside the ISS, will be turned on and will use an external antenna on 12 April 2011 to celebrate the 50th anniversary of Yuri Gagarin's first manned space flight. AMSAT-NA will be issuing special certificates to those stations reporting reception of the 145.950MHz ARISSat-1 signals on this special night. ARISSat1, which was originally going to be SuitSat2, will be hand deployed from ISS into low Earth orbit on a scheduled EVA mission in July. After it is thrown overboard from ISS it will have essentially the same orbital parameters as the ISS and since that is in a relatively low altitude orbit ARISSat-1 will have considerable Doppler shift. I expect that it will not be awarded an AMSAT designation until after it has been deployed.

I guess it will be old news by the time you read this, but three amateur satellites; Explorer-1, KySat-1 and Hermes were lost on 4 March due to the unsuccessful launch of the Taurus XL rocket that was to carry them into space. The primary satellite payload was 'Glory' a NASA climate-studying satellite. The launch anomaly appears identical to the troubles that caused the failure two years ago of another NASA mission, carrying the Orbiting Carbon Observatory, on another Taurus XL rocket.

It sounds like the plot of a scary science fiction movie to me but according to the University of Southampton website, scientists from the University have developed the world's first control system that will allow autonomous satellites and spacecraft to think for themselves. Using natural language programming (NLP), the software agents can read special English language technical documents on control methods. This gives the vehicles advanced guidance, navigation and feedback capabilities to stop them crashing into other objects, agent-based control with mission execution capabilities and the ability to recognise and reconfigure faults. "HAL open the pod doors … HAL?"

It seems that about four lucky ZLs were quick enough to order the Funcube Dongle SDR receivers. These sell out within minutes of each batch being listed, so you have to be ready to press the 'buy now' button at exactly the right time. I am sure the readers would be as keen as I am to hear from you how well they work. One potential problem is that although they work from 64 MHz up to more than 1700 MHz there is apparently a hole between 1100 and 1270 MHz, which may be a limitation for ATV and listening to Satellite uplink equipment on the 23cm band. But you do get 2m, 70cm, TV Ch 39, 32cm, and most of the 23cm band plus of course all of the commercial and TV bands in between. There are reports that the dongle can go as low as 51.5 MHz in the 6m band and to more than 2 GHz. I am not sure if there are any performance issues with these extreme band limits.

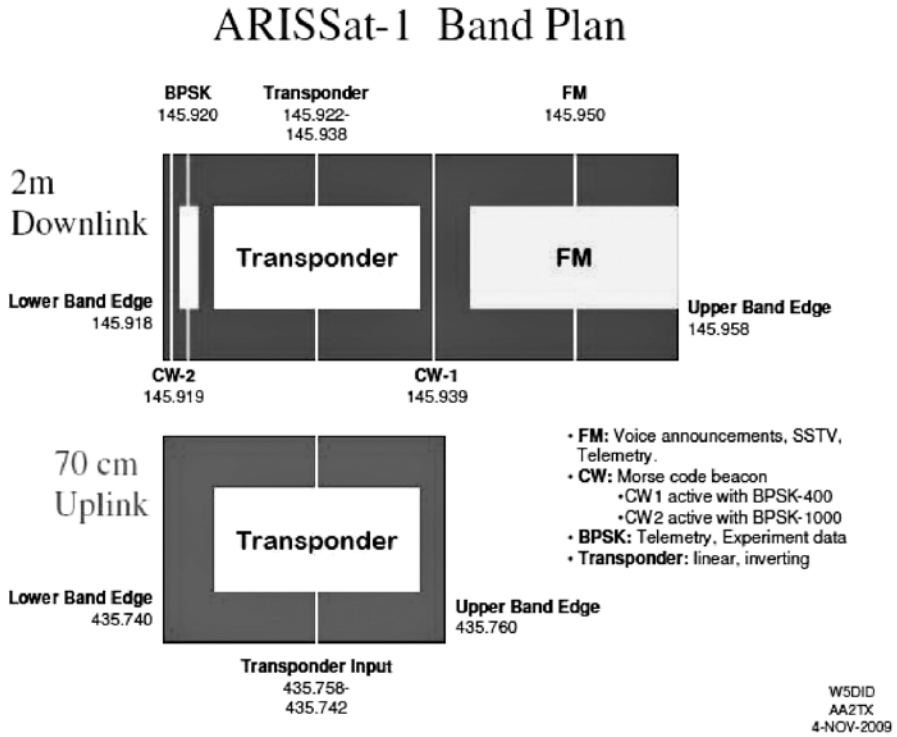
Happy 27th birthday to Oscar 11 which was launched on 1 March, 1984. Clive, G3CWV noted in his UO-11 report that the satellite wasn't transmitting on its birthday but did resume its AFSK FM ASCII Telemetry on 145.826 MHz on 3 March. The satellite is now transmitting during eclipses, although signals are weaker at those times. This indicates that there is still some capacity remaining in the battery. Excellent signals have been reported from stations located around the world, and good copy obtained from de-coded telemetry frames. More information can be found online at <http://www.g3cwv.co.uk/oscar11.htm>.

SA-AMSAT has started the development of a Cubesat project. It has been named 'Project KLETSkous' during its development phase. Once the satellite nears completion it is planned to run a competition to decide on an applicable name for the satellite as was the case for SumbandilaSat.

Project KLETSkous reflects nicely on the mission and functionality of the satellite: "Klets" is an Afrikaans work for talking a lot. We want the Southern African radio amateurs to talk and operate much more via satellite. "Kous" is the Afrikaans word for a sock. The transponder that is planned for the satellite can also be referred to as a "bent-pipe" transponder, aligning the idea to the "sock".

SA-AMSAT this week announced that the main payload on the KLETSkous CubeSat will be a linear UV transponder with a bandwidth of 20 kHz. The UV mode which is 70 cm uplink and 2 m downlink was chosen in line with internationally recommended practice as it will minimise interference.

On a personal note, Carol and I were extremely lucky to come through the Christchurch earthquake with little damage and few losses. At the moment I have my parents living with us as their house was severely damaged along with the loss of many of their precious possessions. I would like to offer my sincere sympathy to any readers who have lost loved ones, friends, houses, or businesses.



ARISSat-1 bandplan.

References

Southgate ARC website, AMSAT, University of Southampton, Funcube Dongle websites. Please send me any news, feedback, requests, questions, hints, ideas, construction projects, interesting new purchases or whatever. I always need updates on the LOCAL activity, <zl3dw@nzart.org.nz>

73, *Andrew ZL3DW*

Break-In 50 Years Ago

Craig Crawford ZL3TLB

***Break-In* March 1961**

An amateur radio printer system

By Bruce Rowlings ZL1WB

To operate a landline typewriter from radio waves it is necessary for the sending station to convert the "open circuit – closed circuit" coding sequence generated by the teleprinter into a radio signal that can be radiated by the "ham" rig, and be picked up on a conventional receiver, then be detected and faithfully reconverted to an "open" and "closed" circuit completely synchronised with the sender's keyboard. This "switch", either mechanical or electronic, must then either interrupt or enable a current of predetermined magnitude to flow through the electromagnet of the receiving printer's selection device, which converts the "current" and "no current" sequences into a mechanical movement of numerous levers in the teleprinter in such a manner that the machine will print onto paper that symbol to which the particular coding sequences corresponds.

How can this be done? On portions of the HF amateur bands an emission known as "frequency shift keying" is permissible. This means that instead of keying the carrier wave "on" and "off" as is done for A1 CW, the actual carrier frequency is shifted a precise and predetermined amount so the initial frequency represents the "closed", un-operated condition of the teletypewriter keyboard. The "open" condition of all or any one of the five parallel coding contacts of the sender's keyboard is then represented by instantly shifting the carrier frequency 850 cycles lower, by convention.

Having achieved the transmission of teletype code the next problem now becomes how to reverse the operation so that the data can be printed onto the receiving teleprinter. The signal is tuned in at the receiver as for CW, with the BFO adjusted to a suitable pitch. When the incoming signal is shifted the beat-note will also change an amount equal to the deviation of the incoming signal.

Since the RTTY signal shifts lower in frequency we offset the BFO to the high end of the IF and manipulate the receiver tuning until a beat of around 2125 cps is obtained. Thus when the received signal shifts 850 cps lower the beat-note changes 850 cps higher, to become 2975 cps.

These two signals are passed through a bandpass filter which will accept signals in the region from about 1900 cps to 3200 cps. Variations in amplitude are reduced by feeding the output of this filter into a symmetrical limiter. Following the limiter are two sharp filters, one of which accepts only 2125 cps and the other 2975 cps, and by detecting each signal the output from each channel is converted to DC which can be applied to a polarised relay which responds to reverses of current flow. Thus is accomplished the "open" and "closed" conditions as exist at the sender's keyboard. Since the system operates in synchronism, the relay will produce instantly the coding sequence exactly in step with the sender.

In order to control the electromagnet of the typewriter the relay contacts are connected to interrupt the flow of current through the DC loop. As the electromagnet is often required to remain open or closed for at least 9 milliseconds of a 22 millisecond pulse this supply must be substantially "constant current" in order that the electromagnet can follow the keying speed. Pulling-type selector magnets require 60 to 70 mA for satisfactory operation.

A vacuum tube keyer is employed to reduce sparking at the relay contacts which generates excessive noise in the receiver. The relay controls the bias of the tube which has the selector magnet wired into its plate circuit. With the grid of the tube grounded the voltage applied to the tube is varied until 60 mA is obtained. A variable cathode resistance is suitable.

Why the frequencies of 2125 and 2975? On VHF audio frequency shift keying is used, wherein an audio signal of 2975 cps is shifted 850 cps to 2125 cps. These two frequencies were chosen to avoid any harmonic relationship to the 850 cps shift. Thus the same receiving converter can be used on HF FSK.

Why not one frequency like CW? Because frequency shift keying provides a continuous signal to the receiver and this assists greatly in overcoming noise and unwanted signals. This two channel system permits noise, which appears almost equally through both filters to create equal voltages which tend to cancel each other, whereas the mark/space signal predominates through their respective filters.

IARU – International Amateur Radio Union

Liaision Officer: John Lochhead ZL4QS
Liaision: Terry Carrell ZL3QL
Stuart Watchman ZL2TW, Peter Lake ZL2AZ

Another year has passed and we are three months into 2011. I have just received advice that the Region 3 IARU secretary Jay JA1TRC has tendered his resignation. Jay has been a strong supportor of Region 3 and it was NZART's pleasure to meet and work along side Jay at the 14th IARU R3 conference held in Christchurch.

Change of IARU Region 3 Secretary

Dear Colleagues

The Directors of IARU Region 3 very much regret to announce the resignation for personal reasons of Seiichi (Jay) Oka JA1TRC as Secretary of IARU Region 3 from 9 March 2011.

Jay became Assistant Secretary to Keigo Komuro JA1KAB then the IARU Region 3 Secretary in September 1998 and on Keigo's resignation, Secretary in June 2009.

The Directors have formally recorded their acknowledgement of his contribution to amateur radio and IARU Region 3 over so very many years.

As required by clause 41 of its Constitution, the Directors have appointed Katsumi (Ken) Yamamoto JA1CJP as Secretary of IARU Region 3 on the nomination of JARL.

In nominating Ken as Secretary, JARL President Shozo Hara JA1AN reaffirmed his society's strong and continuing support of IARU Region 3 and its secretary, at the same time stressing the importance of the regional secretary's independence from any member society.

Ken holds a Bachelor of Science degree in electronics engineering and worked for KDD, now KDDI, in the satellite communications field for many years.

During that time he worked in many countries, including five years stationed in the United Kingdom working with the International Maritime Satellite Organisation. He retired from KDDI in 2002.

Ken is currently head of the JARL International Section on a part time basis.

He was first licensed as a radio amateur in 1967 and today continues to have an active interest in DX and contests.

He was a member of the Japanese delegation representing the amateur service to the recently concluded ITU Conference Preparatory Meeting for WRC 2012.

I am very confident that Ken will make a significant contribution to IARU Region 3 and I am delighted that he has accepted this appointment.

Sincerely,
Michael Owen VK3KI
Chairman, IARU Region 3

NZART looks forward to working with Ken in his capacity as Secretary of Region 3.

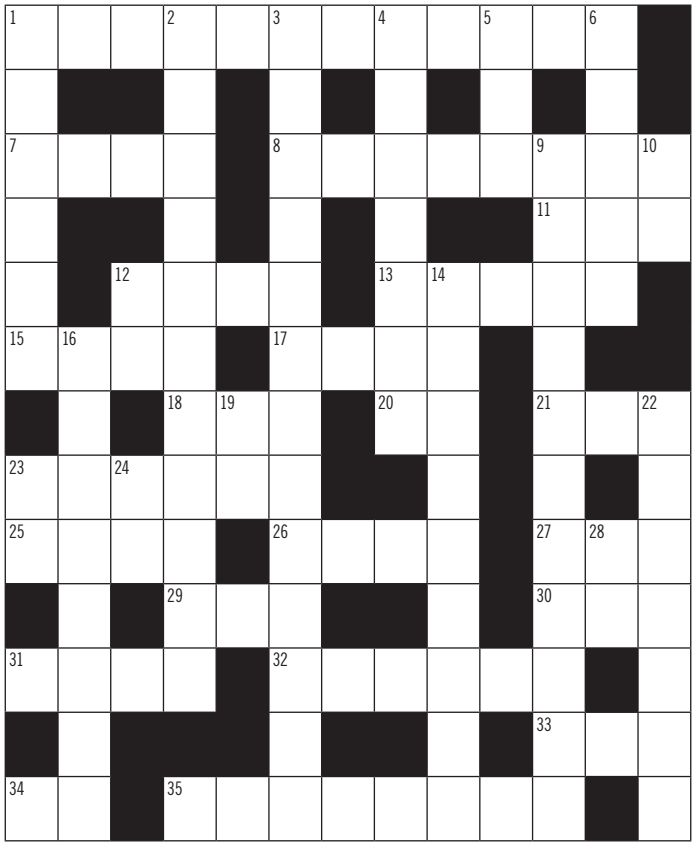
Suceess at the CPM meeting held in Geneva in late February for Agenda Item 1.23 (a secondary allocation for the amateur service near 500 kHz), Ken Pulfer VE3PU who chaired the WG2 and his team worked very hard to achieve the wonderful result with regard to the 500 kHz allocation for amateurs

The majority of the work for ongoing support at the APT (ITU Region 3) APG regional meetings in this cycle has been by Peter

ZL Crossword No. 11

Compiled by Graeme Hunt ZL1ANH

email <graemeh@xtra.co.nz>



Answers to puzzle on page 52

Across:

1. EME fellows (4,8)
7. Punga frond (Maori) (4)
8. At least one in most homes thanks to Bill (8)
11. Resistor colour for #2 (3)
12. Spoken (4)
13. Rechargeable battery type (5)
15. Invisible emanation (4)
17. Rich soil type for your radials (4)
18. A star sign, or (abbrev) closely circling our planet (3)
20. Not the shortest way to dx (abbrev) (2)
21. Voice modulation method patented by J R Carson in 1915 for effective use of spectrum and power (abbrev) (3)
23. Talents (6)
25. Place to get your pension in ZL (abbrev) (4)
26. Send an IRC and SAE if you want one. (4)
27. Frequencies 300-3000MHz (abbrev) (3)
29. One's image of oneself (3).
30. The 22nd letter of Greek alphabet. (3)
31. Arranged contact (4)
32. Search and …….. , in a contest (6)
33. Large US commercial radio organization (abbrev) (3)
34. Land of the Cedrus libani (prefix) (2)
35. Mayday, SOS, types of call (7)

Down

1. Was site of ZL6QH (6)
2. Stablised your finals by cancelling in phase feedback (11)
3. Look at these to check waveforms (13)
4. In name only (7)
5. VK bird (3)
6. QRQ and QRS are about this (5)
9. Devices that convert one form of energy into another (11)
10. Where NZ country people live (abbrev) (2)
12. US State whose capital is Salem (abbrev) (2)
14. Measured in Ohms, resistance to ac only (9)
16. Radio connected to the satellite (8)
19. Capital of this country is Kishinev (prefix) (2)
22. Winding type often used in baluns (7)
23. Pacific French territory, west of Samoa (prefix) (2)
24. Indefinite article (2)
28. Caribbean Island devastated by earthquake in 2010 (prefix) (2)

Lake ZL2AZ and Shizuo Endo JE1MUI, as Directors of IARU Region 3. The NZART ALO and Peter Lake provided a written report and recommendations Council prior to the recent APG-4 meeting in December 2010 in Hong Kong. This recommended what is now "re-numbered" as Method A, with a fall back to (new) Method B. This approach was accepted by both the MED in the NZL input document to the APG-4, and the IARU Region 3 information paper to the APG-4 meeting. The original "Method A" had got to the point where it could not be supported any more, and this was recognised in the APG-4 outcomes. The outcomes of the APG-4 have already been reported in IARU Region 3 News. This previous work at the APG-4 was based on the earlier "Draft CPM Report" that has now been reviewed and completed to a "Final" document (for all the agenda items). It is now increasingly difficult to change this "technical" input and the "re-numbered" Methods in the lead up to WRC-12. The point to note is that while we had "majority" support for this agenda item at the APG-4, there were still two countries opposed. We need more administrations/countries to support us. The next (and final) APG-5 meeting will be in Busan, Korea in September 2011. WRC-12 will be held in January/February 2012, in Geneva, lasting one month.

Dave Sumner, K1ZZ comments on the result:

I'm pleased to report that Document 175 (Rev. 1) was adopted by Plenary this afternoon without meaningful comment or change. Removal of the original Method A came about because there was no administration support for retaining it. Given that, it is just as well that it has been deleted in order to avoid confusion. I believe there is more support now for some form of amateur allocation below 487 kHz than there was at the beginning of the CPM.

Congratulations to all concerned and especially to Ken Pulfer.

John ZL4QS
NZART IARU Liaison Officer

Letters To The Editor

All Letters to the Editor must be signed and include the author's full name, call-sign, (if applicable) and address. Opinions expressed here are those of the author and do not necessarily reflect official NZART policy.

Letters to the Editor: guidelines to contributors

Letters to the Editor should be concerned with Amateur Radio and normally not exceed 400 words. Break-In *follow the guidelines given on page 4-3 of the 2002-2003* Call-book *"Standards of language, and topics best avoided". Accordingly sex, race, religion and politics are not acceptable subject matter.*

Yaesu FC-40 Automatic Aerial Tuning Unit

Sir

Recently I purchased a Yaesu FC-40 Automatic Aerial Tuning Unit to connect into my Yaesu FT897D Transceiver and have set this unit up with a random length of wire. I have followed Yaesu's setup instructions and when I come to Item 10 "Press the (A) (TUNE) key to turn on the FC-40 ATU" the word "TUNR" does not appear on the top right hand corner of LCD screen as the instructions said it would.

Do any of your readers have any ideas what I might be doing wrong or is this a fault?. Have any of your readers got a Yaesu FC-40 ATU?

Keith Stanton ZL3QH Email <keith.stanton@clear.net.nz>

VHF Scene

Stephen Hayman ZL1TPH <zl1tph@xtra.co.nz>
Simon Watt-Wyness ZL1SWW <zl1sww@nzart.org.nz>

Greetings for the second edition of VHF Scene for 2011.

After many years, the first Trans-Tasman crossing has finally been bridged between New Zealand and mainland Australia on the 2.4 GHz amateur band.

From past history, our NZART milestones indicate the first crossing on 2 m was with ZL3AR to VK2AH in 1951. The first crossing on the 70 cm band was in 1979 between ZL1TAB and VK2BQJ. Following that, in 1982 was another Trans-Tasman first, between ZL1AVZ to VK2BDN on 23 cm.

6 m reports and DX activity

The summer Sporadic E season may have been somewhat late starting but it did produce some memorable 6 m DX. There was also much conjecture about the propagation modes active on the longer distance contacts (>10 000 km) taking into account that F2 was unlikely with Solar Cycle 24 having only just started.

From mid-December through January there were regular openings from ZL to VK with all VK states worked by early January. There was some excellent propagation to VK6 in mid-January resulting in QSO's over 5000 km with just 5 Watt output.

From the Pacific E51CG, FK8AI and FK8CP were regularly heard and the VK9NA, VK9L/VK5CP and H44DA DXpeditions provided some variation. VK0KEV from Macquarie Island was also active, but apparently not worked from ZL. E51WL returned to Penrhyn Atoll in the North Cook Islands in early February and was worked a couple of times. Hawaii was worked on 13 January with KH7Y peaking at S-9 in ZL1 and ZL3. The NH6P beacon and KH7Y were also heard weakly in mid-February but no QSO's resulted.

OA4TT from Peru was worked on three occasions from late December until mid-January, but propagation from other areas of South America was limited with ZL2TPY only reporting Chilean "elevator muzak" around 40 MHz on 14 January.

After last summer's success working K6QXY a dedicated effort was made on the North America path and the keen were rewarded with regular openings from mid-December until mid-January. As well as K6QXY, other stations in W5 and W6 were also heard and worked on a few occasions. This culminated in a spectacular but localised opening on 11 January from the far north of ZL with 26 W's and an XE worked in a narrow tract from southern California and the north western corner of Mexico, right through to Illinois at 13 100 km.

Spasmodic openings to Asia occurred between mid-December and mid-January with their winter Es propagation linking into the southern hemisphere summer Es. Again the openings were quite localised but sometimes strong with ZL2DX and ZL4PW working JA with S9+ signals. DU7/PA0HIP and DU1GM were also worked in ZL1, 2 and 3.

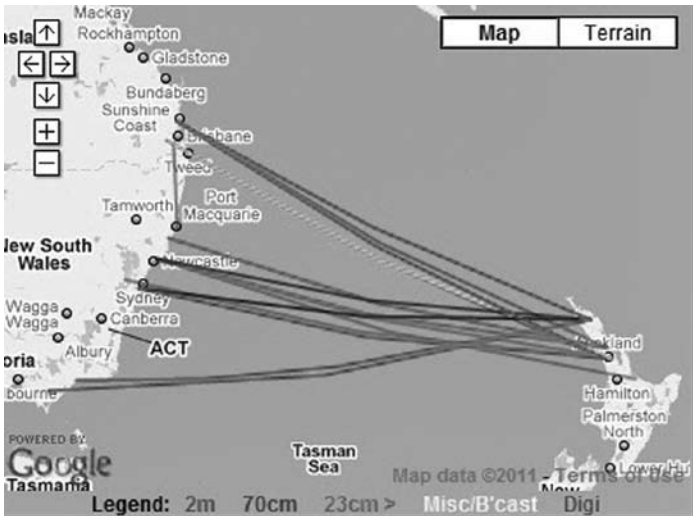
The summer Es conditions tailed off from mid-February with only single hop Es propagation to FK8 and weak openings to VK4. However, indications of TEP to JA have started and there is hope that the strong increase in solar activity from mid-February will provide some interesting equinox propagation.

2 m band Sporadic E

To the best of our knowledge, these were the 2 m Es this summer DX season ending 31 February this year. A 2 m Sporadic E opening occurred on 19 December UTC in the early evening around (06:35 ~ 07:31 UTC) with ZL1 working many VK2 stations. This was reported in the last edition of VHF Scene.

3 January with southland stations around 08:46 UTC with stations, ZL3NW, ZL4LV, ZL3AUU, ZL3JT, ZL3ADT, ZL4PP and ZL3TLA were working VK1 and VK2 districts.

On 12 January between 22:00 to 23:50 UTC, ZL1 were working both VK4, VK2. Also on 12 January at



2 m 70 cm and 23 cm contacts on 31 January 2011.

22:40 UTC ZL3OZ worked VK9NA at 1712 km. The same afternoon, on 13 January Bob ZL3TY reported working 27 station in total; VK4, VK2, VK1 and VK5 stations with reported VK5ZK as Bob's first VK5 terrestrial contact at 2917 km and reported as a nice double hop opening.

David ZL4DK also reported working two VK2's with only 25 W mobile and a ¼ wave whip while parked on the grass at Haast Township on Thursday 13 January. The following day, being Friday 14 January, David reports, "there was a lovely opening to VK2 and VK4 on 2 m. I worked VK4OX 5/3 over a 2 hour period, along with VK2BCC, VK2ZT, VK2DVZ, and VK2AMS. This was from Knight's Point and I logged the first QSO to VK4OX at 2031 local time.

On 15 January at around 23:24 UTC, ZL1 worked numerous VK2 stations via 2 m Es.

1296 MHz internal ZL distance record set

On Friday 14 January, around 05:40 UTC Brian, ZL1AVZ, on the west coast of Auckland in RF73FD worked David, ZL4DK in RE46OG, Knight's Point on 1296 MHz at approximately 884 km. The propagation mode was tropospheric ducting and the transmission mode was CW.

Brian, ZL1AVZ reports, "I was using an ICOM 910 on 1296 MHz with 10 Watts and a 20 dB horn. Signal reports were 5/2 both ways on CW. David, ZL4DK reports his station from the south, "the equipment at my end was a home built "Zero IF" built to the design by S53MV. This was followed by a 10 W amplifier using a RA18H1213G power module and a VK5EME preamp on receive, with a 3.3 metre diameter stressed mesh dish." Congratulations with this excellent internal distance achieved on the 23 cm band.

1296 MHz opening from ZL to VK

The first of this summer DX season across to VK on 23 cm, Brian, ZL1AVZ worked Ross, VK2DVZ on 1296.1 MHz at 2087 km on 26 January 2011, along with Mark VK2AMS who also worked Brian. This opening was alerted a few hours before when Leith ZL1BCJ worked Ross on the 2 m band, along with Nick, ZL1IU just after. Adrian VK4OX also worked Brian on 2 m at 2317 km and then attempted 1296 MHz. Although Brian was heard no contact resulted. This tropospheric opening lasted for a number of days till around 2 January 2011 with other ZL1 stations working VK3, VK2 and VK4 with contacts on bands between 2 m, 70 cm, 23 cm.

2.4 GHz (13 cm) ZL to VK Tran-Tasman firsts

On 27 January 2011 at 03:26 UTC Steve ZL1TPH/p in RF73HM worked Adrian VK4OX in QG63KF at 2314.5 km on 2403.1 MHz with 5/8 report (Thusday 27 January 2011 at 4:26 pm)

On 27 January 2011 at 21:41 UTC Brian ZL1AVZ in RF73FD worked Adrian, VK4OX in QG63KF at 2317.5 km on 2403.1 MHz with 5/3 report (Friday 28 January 2011 at 10:41 am).

On 27 January 2011 at 21:56 UTC Brian ZL1AVZ in RF73FD worked John VK4JMC in QG62FI at 2305 km on 2403.1 MHz with 5/3 report (Friday 28 January 2011 at 10:56 am).

Transmission mode with all three contacts was SSB, and the propagation path mode was tropospheric ducting.

ZL station activity to VK9NA DXpedition 2011

The station operators, with the VK9NA DXpedition to Norfolk Island 9-19 January 2011 were, "Alan VK3XPD, Kevin VK4UH, Michael VK3KH and Andrew VK1DA.

From the log of VK9NA 2011 with contacts to ZL stations only; On 6 m contacts to ZL1AIX, ZL1AMO, ZL1AVO, ZL1NX, ZL1RS, ZL1SWW, ZL2ASF, ZL2DX, ZL2OK, ZL2TDA, ZL2TPY, ZL2WHO, ZL3ADC, ZL3ADT, ZL3AUU, ZL3JT, ZL3MH, ZL3NW, ZL3RW, ZL3TY, ZL4DK, ZL4LV and ZL4PW.

One 2 m EME contact to Bob ZL3TY. On 2 m SSB direct, ZL1AVZ, ZL1BK, ZL1TPH, ZL3OC, ZL3OZ and ZL4DK. 2 m FSK441 with meteor scatter were ZL3CU, ZL1TPH, ZL3TY and ZL4LV. With 23 cm, 13 cm, and 6 cm both SSB and Digital modes to ZL1TPH with a one and only SSB contact on 9 cm.

New Zealand amateur radio operators would like to thank the VK9NA team for activating Norfolk Island once again in January 2011. From the VK9NA team, "please extend our thanks to all ZL's who made the effort to work us. We just hope there were not too many who could not get through."

VHF DX Weekend contest report

VHF DX contest weekend on the 5-6 February 2011 saw excellent band conditions throughout New Zealand. Checking the Hepburn tropo predictions propagation charts prior, indicated promising band conditions ahead.

From the northern perspective, one has to thank the many stalwarts who come up on these occasions to support the contest event, notably ZL2IP, ZL2TAL, ZL1HI, ZL1AKW, ZL1TWR to name just a few. It was also heartening to hear some new calls from the central Wellington region. Justin ZL2UGL came up on 2 m SSB with good signals from Newlands at 540 km, along with ZL2FAE from Lower Hutt at 510 km north to Cape Rodney.

From Cape Rodney, the ZL1SWW contest station (Leith ZL1BCJ, Franc ZL1SLO and Simon ZL1SWW) operated at 375 metre ASL north of Auckland city. The most southern team, were David ZL4DK and Terry ZL4TAE who were at the other end of the country at Swampy Summit near Dunedin. There were a many home stations active as well.

Terry ZL4TAE reports, "Before the contest, David ZL4DK calls "Shall we do it? So Saturday afternoon we met at the Swampy Summit gate, drove to the top, erected aerials, solar panels, cables, rotator etc and by 1700, all was ready. Just one problem, 2 m was dead, traced to a coax adaptor with the centre socket splayed out.

"With that fixed, we were on the air and 2 m band signals were good, even as it started raining and the usual stations were worked. Best 2 m DX was to Chris ZL2DX at 646 km, Bob ZL3TY in Greymouth was worked once on CW and the 6 m band opened up sporadically and we made one contact to ZL1SWW at 1117 km.

"We were totally miffed on Sunday to hear Simon ZL1SWW had worked into ZL3 Christchurch on 2 m direct. The conditions to the north must have been very favourable but nothing heard at our end unfortunately. Overall contacts were average to down on previous years but the addition of David's 1296 MHz gear and 3 m portable dish built up our resources. Contacts summary for the ZL4DK team on 6 m were with 23 contacts, 2 m was with 72, 70 cm was with 34, and 23cm 11 contacts were in the log.

"What to do for the 2011 December contest? Swampy is an excellent site, 750 m ASL and 360° views (us city Dunedin dwellers are totally surrounded by hills). We both enjoy rigging for FD's and we have worked into ZL2 virtually every FD (best DX, Hawkes Bay) and our goal is to work into ZL1.

We would like to improve our setup, but an 18 element 2 m band array is big enough for a FD rig, the PA/preamp is installed in a housing up the mast to eliminate feeder losses so we are at the mercy of conditions and having northern stations point their beams south. But the best of FD's is the chance to chat with other VHF'ers and if our regular presence helps to build interest in other districts (especially FD ops), that's just great."

Simon ZL1SWW reports, "We had beautiful weather with the sun beating down on the Saturday and some great signals heard on the microwave bands from Cape Rodney north of Auckland. Ted, ZL2IP was S9 on the meter on 5.7 and10 GHz. Further attempts were made on 24 GHz at 340 km, it was just too far; the path losses with humidity and water absorption with distance would have been extreme. We also had many good contacts on 1296 MHz with Dave ZL1AKW, Ray ZL2TAL and Ted ZL2IP with the ultimate highlight of working Chris ZL2DX at 559 km distance.

The 6 m band was pretty flat with many local contacts, but again highlighted by working Peter ZL4LV and David's team of ZL4DK from Southland. It was good to hear the QSO going on between Murray ZL1HI on Great Barrier Island worked ZL3TY in Greymouth on 2 m at 781 km! Towards VK in the contest, "Ray ZL2TAL was happily working the VK2 stations on 2 m along with ZL3TY, ZL1AKW and ZL1BK doing the same.

Later on, we worked Starr ZL3CU at 826 km, along with Rod ZL3NW at 819 km on 144 MHz. Rod mentions, "I first heard you calling or working Bob ZL3TY, not that there was any sign of Bob here. I gave the odd call and then gave a call or two on CW as I thought that may get through. Then as you know I went back to SSB and there you were again. I was at my home station about 1 km south of Kaiapoi on the flat. After we completed the contact I gave Starr ZL3CU a telephone call as I knew he had been about a little earlier and had a good set up. Rod was using a TS2000x which is one of the earlier ones and has yet to do the modification on the internal RF preamp as later models have. Bias on the RF pre amp FET is not correct and as such has low RF gain and performance is not that good.

All in all, we had a great time and enjoyed the fellowship of the other hams. What a great way to spend the weekend. It's so much fun getting up in a high spot and seeing what your equipment can do, we encourage anyone to give it a go or at least visit someone you know that is going up the hill to experience the fun.

Getting up on the air these days is easy with the advent of many of the modern multiband / multimode radios available. Antennas are easily made with the help of some of the commonly available modelling programs such as Quick Yagi <http://www.raibeam.com/wa7p2.html> by the late Chuck WA7RAI, VK5DJ <http://www.vk5dj.com/Yagi/Yagi.html>, with his Yagi Calculator as well as some nice designs by G0KSC <http://www.g0ksc.co.uk/> with the LFA and variants of this design. Get building and we hope to hear you on the air next contest!

Recent 6 cm band activity from Ted ZL2IP

Steve ZL1TPH/p, was planning to spend time at Cape Reinga in January 2011 endeavouring to contact VK9NA. As part of this activity he sent me down his second best 6 cm rig (11W, 600 mm dish) with a view to checking out the gear over this path. The troposcatter loss over the 551 km from the north Mt Egmont to Cape Reinga is 262 dB. Steve's end is 100 Watt, 1.2 m dish so the equipment capability was 254 db north to south, and 244 dB south to north. Clearly we needed an additional 10 to 20 dB help in the form of a tropospheric duct somewhere along the path.

On 5 January, Steve, who keeps a close eye on Hepburn, decided to go to Cape Reinga and try our luck. The 144 MHz (2 m band) link was nothing flash, but on firing up the 5760 MHz there was a signal, down in the noise to begin with, but useable. After quite a bit of testing with dish alignment and a faulty transfer relay, we managed a 5/3 SSB contact both way. So, if verified, a new internal SSB distance

continued on page 44

Contests

Contest Manager: Frank Hunt ZL2BR
<zl2br@ihug.co.nz>

Contesters need edges

Serious contesters plus those who just want to do the best they can with an average station, should always be on the look-out for a new 'edge'.

If you are a fairly good contest operator, lots of money for the best gear plus lots real estate for an antenna farm will give you an edge over most other operators, but, there are a few more, low or no-cost 'edges' available.

For instance in last month's Contest column I talked about Skimmer and the Reverse Beacon Network. The DX-Cluster can also give you an edge over those who don't use it.

There are several ways to access DX-Cluster information. Visiting websites such as: <http://www.dxsummit.fi/DxSpots.aspx> or <http://dxcluster.ham-radio.ch/> is the easiest way.

Modern contest logging software programmes include provisions for you to connect via the internet to a 'Telnet server' which in turn is connected to the world-wide DX-Cluster network. If you are not using contest logging software you will need some other software to connect to a Telnet server. <http://www.ve7cc.net> is a good place to start.

Propagation: A good understanding of knowing when and where to in the world, particular bands will be open may also give you an edge. I guess most of us rely mainly on our past operating experience in this regard, but there is some other help available. One of the most popular helpers available is the W6ELProp propagation forecast software programme.

Download it from: <http://www.qsl.net/w6elprop/>.

Beacons

The world-wide NCDXF/IARU HF beacon network has been operating for many many years and is an extremely useful tool for checking out *real-time* propagation. Monitoring the beacon frequencies will give you a good indication when the paths between ZL and wherever is open.

When can they hear us

But how does the rest of the world know when the bands are open to ZL? That is, when do they hear the **ZL6B** beacon? There are a number of automated beacon monitoring stations around the world and their on-line data on what beacons they can receive and when, is very interesting stuff indeed. All is revealed at: <http://www.ncdxf.org/beacon/monitors.html>

JIDX CW Contest

The Japanese International DX Contest a very friendly and fun contest, organised by the JA 59 ham radio magazine, is one of my favourites. You can only work JA's, but there are lots of them to work. The JIDX Phone contest is held in November.

VOLTA DX RTTY Contest

Another favourite contest, mainly because the scoring system gives me a break, as the points scored for each contact are directly proportional to the distance between the zones of the stations in contact.

CQ WPX CW Contest

A very popular contest, heaps of categories, lots of certificates to be won and it's really not that hard for ZL's to make a few hundred contacts in just a few hours operating. Many rare DXCC entities and DXpedition stations show up for this contest. It's all about working callsign prefix multipliers (WPX) of course and there always lots of unusual prefixes that appear each year.

International HF Contest Calendar for April-June 2011

Contest	Date	Time (UTC)	Website
JIDX CW	Apr 9/10	0700 Sat – 1300 Sun	<http://jidx.org>
SP DX RTTY	Apr 23/24	1200 Sat – 1200 Sun	<www.pkrvg.org/zbior.html>
ARI International DX	May 7/8	2000 Sat – 2000 Sun	<www.qsl.net/contest_ari/>
VOLTA DX RTTY	May 14/15	1200 Sat – 1200 Sun	<www.contestvolta.com>
CQ WPX CW	May 28/29	0000 Sat – 2400 Sun	<www.cqwpx.com>
All Asian DX CW	Jun 18/19	0000 Sat – 2400 Sun	< www.jarl.or.jp/English>

◂ *continued from page 43*

record for this band. Cool fun! Now for 3.4 GHz! (Ted, ZL2IP)

2011 VHF-UHF-SHF Contest Calendar

Low Band Contest: Bands 50 MHz to 440 MHz. 2-3 April. Note that Daylight Saving ends half way through the contest; NZ Local Time applies on both days of the contest.

Hibernation Contest: All bands 50 MHz and up. 11-12 June. This is the weekend after NZART Conference.

Brass Monkey Contest: All bands 50 MHz and up. 6-7 August.

Microwave Contest: All bands 614 MHz and up. 1-2 October.

Field Day Contest: All bands 50 MHz and up. 3-4 December.

For all contests, the operating periods are 1700 to 2300 on the Saturday, and 0700 to 1300 on the Sunday, NZ local time. The complete Contest Rules are available at: <http://www.vhf.org.nz/pubs/Contests/VHF-UHF-SHF-ContestRules>.

Summary

Acknowledgement; to Bob ZL3TY, Rod ZL3NW, Bob ZL1RS and others for assistance and input with 6 metre band news.

If you have input and pictures for the columns ahead; such as DX activity reports, repeater installation, branch activities, snippets of interest, technical items etc, please to Stephen ZL1TPH email <zl1tph@xtra.co.nz> and Simon ZL1SWW <zl1sww@nzart.org.nz> or Call-Book addresses. (We also accept large picture files sent via email).

Awards

Awards Manager: Alan Chapman ZL3GX
<awards@nzart.org.nz>

As I write this column Christchurch is still being rocked by aftershocks. On a personal note we have had very little structural damage from to our house from any of the earthquakes to date. However 22 February made a much better job of emptying out our bookshelves and this time it included the shelves.

As for the shack, 4 September the radios and shelves came down. Since then I have taken precautions and earthquake proofed the shelves so this time the radios stayed on the shelves.

I have not been notified of any awards for the next months. If you are going to have an award for a special event please send me the details. My contact details are at the end of this column.

Club Awards

Clubs running short-term awards or new awards should send details of the award to me via email or at my *Call-Book* address or the address below. Remember that *Break-In* is only published on even months and copy, including, if possible, a copy of the certificate, for inclusion, should reach me by the end of the even month.

The Awards Net runs on 80m, 3.677 MHz every night from 0800 UTC every night of the year. Every one is welcome to join in especially if you are mobile and in a rare county or district.

NZART Awards Manager, PO Box 1733, Christchurch 8140, <awards@nzart.org.nz>, <www.nzart.org.nz/nzart/awards/#nzartawards>.

AREC – Amateaur Radio Emergency Communications

Geoff Gillman ZL3QR and Bev Gillman ZL3OV

AREC Mission Statement:
To be the preferred provider of Emergency Communications to New Zealand Emergency Services.

Hi, everyone, once again Christchurch has been hit by a major earthquake, this time with very serious consequences.

In a complete reversal of roles from the previous one, Christchurch AREC has been extremely busy while our North Canterbury AREC has only had some very minor activities. We hope to bring a full report on this event in the next issue. Meanwhile, we have here a report on the Silverfern Rally.

Silverfern Rally report

Mid-November saw the Marlborough Amateur Radio Club, Branch 22, involved in the third biennial Silverfern Rally. This is for classic rally cars run on special stages over seven continuous days. The Club provided communications to the start and finish of each stage for handling timing information, and on the longer stages to intermediate safety points for car tracking.

Although the rally was run south of and including Canterbury, the communications base was in Blenheim. This year Branch 22 was asked to set up base at the finish point in Queenstown; but this was just not going to happen as the logistics would have been horrendous. The remoteness of the Blenheim base added its own problems, mainly on HF where the paths become longer and more unpredictable. A large number of the field operators were Marlborough club members which meant many kilometres travelled, the southern most stages were in Southland on day six.

Communications to field stations was via three modes: IRLP linked repeaters, commercial Fleetlink radios and HF. The Blenheim 695 IRLP node was shifted onto a simplex frequency for the duration, and a variety of IRLP capable repeaters were used over the whole rally. The club's portable IRLP node was again used and proved invaluable. IRLP was an anchor for the event, allowing field operators travelling mobile to their points to check in to base that they were up and en route, very reassuring for the base team! The same mode was also used to co-ordinate which method would be used for a particular operator to contact base for messages once in position.

As for 2006, having the diversity of the three modes was essential for the smooth running of the event. A number of positions were only accessible via HF (via the two remote sites in Blenheim) whereas others found themselves located near power lines wiping out HF with noise and were restricted in same cases to IRLP as they did not have Fleetlink gear, or coverage if they did. This year we really pushed the importance of every operator if possible monitoring 2m simplex. This proved invaluable, as at times some sites could only be contacted via simplex relay to another operator.

The start and finish timing crews had their own commercial Fleetlink comms as did the safety and sweeper vehicles, however Fleetlink fell over in a number of remote places with the result that the club handled messages for those crews as well. Some of these messages were vital for the running of stages involved.

About two thirds of the 60 odd cars that entered were Mk1 and Mk2 Ford Escorts, the rest were a variety including Holden Commodores, a couple of Mazda Rotaries and even a Ford Mustang and a late 1960s Falcon, a veteran of the 2000 London-Sydney rally. The attrition rate was fairly high with many cars leaving the road in a variety of exciting ways. The author witnessed an RX3 nearly rolling after losing a wheel just past a safety point on a stage in central Otago. Not all are repairable in the duration of the event, many others suffered mechanical failures with the same outcome. As the days went by duct tape and other field repairs were increasingly visible.

As usual the field operators coped

▶ *continued on page 46*

The Rally operations base (photo by by Ken Hynds, ZL2KHZ).

On the road at Banks Peninsula.

Winding Creek Mid-point.

Winding Creek.

◂ continued from page 45

with a variety of conditions and weather, including the full range from the heat and dust through to near zero temperatures with wind and rain on the final Nevis stage, south of Alexandra, on the final day, and some timing crews that were on the steep bit of the learning curve. Some field locations proved to be quite challenging sites for putting up HF dipoles, and in more than one case (yours truly included) at the instruction of officials (although being in the correct initial position) had to move with little time prior to the stage start, having to temporarily abandon their HF antenna. In my case 40m was in great shape and was able to operate with a mobile whip.

Once again Geoff Gillman ZL3QR in Rangiora proved to be invaluable as an HF relay and propagation monitor during the entire event. Geoff also monitored the 'old' HF channel when a shift in frequency occurred to prevent anyone becoming lost.

Base was the usual mixture of calm efficiency and occasional pandemonium as a variety of 'events' covering the full range imaginable occurred (in no particular order): IRLP drop outs, changing HF conditions, mobile operator car failure, one mobile operator sleep-in, HF remote site partial failure, serious crash on day one in a comms poor area, a spurious complaint re operating standards and base operators getting their headsets tangled. I am sure there were many more! Thanks to all the spouses/relatives of club members who helped as message runners at base.

As in past Silver Fern rallies the event ran over seven days, in the remotest parts of mainland New Zealand, some stages 700 km from base, often remote from any existing communications infrastructure, using a number of operators not well known to the club. Despite all this the event ran smoothly, which is a credit I think to those who organised the event and all the base and mobile operators from all around the Mainland. A relatively few points for improvement have been identified during the debrief.

Check point at Waitohi Hill end. The 3 Hams with the dipole are (l>r) Grant Simpson ZL2BK (Br 22), John Graham ZL4RO and Dave Hetherington ZL3UDH (Br 34).

A locked gate at Waitohi Hill finish point nearly caused a crisis.

Thanks to the organising team: Helen Harris, Ken Hynds, Rob Carter, Paul Rennie, Stuart Watchman, Chris Grant, Grant Simpson and Harry Stephens.

Amateurs involved in the event (apologies for any omissions): ZL's, 2HH, 2BDD, 2KHZ, 2IW, 2RE, 2IDM, 4HES, 2RKL, 2CHG, 1TKG, 2AYZ, 2ROS, 2AZK, 2AWY, 4JH, 4SB, 4KS, 4AM, 4TL, 4LS, 2BGL, 3RON, 3GL, 3QR, 3MJS, 3TMB, 3DMC, 3RO, 3NK, 3UDH, 4TAE, 3HB, 3RX, 3VP, 2BNE, 2TW, 1UD.

Stuart Watchman ZL2TW

Activity Briefs

(A selection from Jan/Feb.)

2/01/11. Manawatu Branch 20. SAR. Tararua Ranges. Missing tramper, 2 day search. Tramper walked out of the other side of ranges.

3/01/11. Marton Branch 23. SAR. Tararua Ranges Assist Levin SAR with Search for 63 year old male missing on tramping trip. Stood down at 1745hr, missing party having walked out to safety.

5/01/11. Northland Branch 28. SAR. Maunu, Whangarei Urban search for missing 90 year old female. Not located, no sign, Police SAR enquiring and searching further.

8/01/11. New Plymouth Branch 27. SAR. Waiaua Hut, Mt Taranaki. Male tramper missing after short tramp to Brames Falls with sister and niece. Three teams searched during the night and were joined by four more teams in the morning, missing man was found fit and well at 10:46 am in river, making his way downstream.

10/01/11. Thames Branch 41. SAR. Turua. Alzheimers patient missing. Found at house next door.

14/01/11. Otago Branch 30. SAR. Allans Beach, Otago Peninsula. Search for a missing surfer in the Allans Beach area. Assist Dunedin Marine SAR by parking on Sandy Mount overlooking the bay, passing messages to the IRB and Jet Ski search teams via MM69 and monitoring the input of the MM62 repeater for any stations who might not be getting into the repeater. The Dunedin City Civil Defence Communications Unit was also deployed. After about two hours the missing person was located in Dunedin city safe and well.

15/01/11. Christchurch Branch 05. Sports & Training. ZL3 Buildathon and Amateur Radio Day. Public Display; AREC vehicle included in the Jan 2011 ZL3 Buildathon event in conjunction with Amateur Radio Day. Provided AREC Comms vehicle for static display to showcase Amateur Radio involvement in community (SAR & CD). This event attracted attention from two newspapers and Radio New Zealand each with specific questions about the role AREC played in local emergency and SAR events. Good publicity for AREC locally and also for Amateur Radio in general. Thanks to the organisers of theZL3 Buildathon for this opportunity.

16/01/11. North Canterbury Branch 68. Rural Fire. Ashley River, Rangiora. Large Rural Fire on edge of riverbed. Two separate fires combined in very hot gusty NW covering about 3 ha. Multiple turn-out with NZFS, Rural units, helicopter, + Forestry units. AREC provided comms/ logistics for the two forestry units.

20/01/11. New Plymouth Branch 27. SAR. Mt Taranaki. Male disoriented near Brames Falls needing assistance to get off mountain. Located by helicopter and winched off mountain.

21/01/11. Wairarapa Branch 46. Sports & Training. Hood Aerodrome, Masterton. Provide comms for three days during air show for liaison between Fire, Police, St John, Security and air show officials. Good days on Friday and Saturday but show cancelled on Sunday due to bad weather.

24/01/11. Thames Branch 41. SAR Te Puru, Thames Coast. Woman missing after swim in sea at Te Puru, 1820 23.01.11 After search of Thames coast beaches, she was found walking in a bewildered and hypothermic state on an inland road at Te Puru.

27/01/11. New Plymouth Branch 27. SAR. Ram Stream area, Mt Taranaki. Tramper gone off track on mountain. Located by helicopter assisted by ground parties, winched to North Egmont.

30/01/11. Christchurch Branch 05. SAR. "The Apprentice" in Lewis Pass area. SAR teams deployed to assist recovery of a member of a three person tramping party who had broken his

ankle. AREC were requested by RCC to monitor 3023 kHz and 5680 kHz from Christchurch as Taupo Maritime radio were unable to hear SAR teams and party on the night frequency. Monitoring was maintained from 2200 (30 Jan) – 0100 (31 Jan) and then from 0600 – 1700 (31 Jan). Operators liaised throughout period with Taupo Maritime operators. Injured tramper was successfully airlifted out following day. Radio watch maintained until SAR teams also returned from area.

2/02/11. Manawatu Branch 20. SAR. Whariti. Missing 64 male. Found deceased.

2/02/11. Marton Branch 23. SAR. Woodville Area. Assistance call from Palmerston North. SAR. Shift change at 1500 hr. Search for missing male. Report to Palmerston North Airport. Stood down at 1400 hr, missing party located. Fatal result.

6/02/11. Christchurch Branch 05. SAR. Akaroa, Banks Peninsula. Missing 45 yr old male from small farm above Akaroa. Suffers from epilepsy. Missing after stock check previous evening. 12 Banks Pen. Land SAR & Police SAR deployed. Missing party was found at first light by police containment team. AREC stood down again at 0645hr (just as team were leaving Christchurch).

6/02/11. New Plymouth Branch 27. SAR. Mt Taranaki. Husband and wife lost on Maude Track between waterfall and road. 1 ground party and helicopter dispatched, missing party located and winched by helicopter.

11/02/11. North Canterbury Branch 68. Sports & Training. Waimakariri River. Coast-to-Coast Endurance Event. Assist Chch AREC by operating as Town Base and manning one checkpoint for the event. (Due to Earthquake Comms activities, Christchurch Branch 05 have been unable to enter an Activity Report for the Coast-to-Coast event.)

13/02/11. Tauranga ECG Branch 88. SAR. Paengaroa, Bay of Plenty. Kaituna River. Locate missing hunter who chased a pig into the Kaituna River and vanished. An extensive search by Tauranga Search and rescue teams completed a river bank search and established that the missing hunter had not exited the river. Police dive team arrived 16:30 hr and completed several sweeps of the river from point of entry with no success. Darkness prevented any further search for the day.

14/02/11. Tauranga ECG Branch 88. SAR. Kaituna River near Paengaroa, Bay of Plenty. AREC provided communications for the Police dive team. Police recovered missing hunter's body at 10:30.

19/02/11. Wellington VHF Group Branch 74. SAR. SAROP for missing diver, Wellington South Coast SAROP based on a dive tank found floating 1 km offshore. Meeting at Central Police decided to plan for morning shore search. Owner of tank located by police at home.

20/02/11. Tauranga ECG Branch 88. Sports & Training. Cnr State Highway 2 and Pahoia Road, Omokoroa. To provide communications for the Te Puna Scout group annual Mud slide event. Over twelve hundred scouts attended the mud slide, one scout received a deep cut to his foot and was sent to Tauranga Hospital by Ambulance, other scouts minor cuts.

Conclusion

Thanks to those who have contributed to this issue. Material for the next one to please be in our hands by 3 May. Photos, if included, preferably on a separate CD (with captions) mailed directly to us. E-mail pix may be acceptable but will be at the Editor's discretion and must not be embedded in the text. Contact details: <zl3qr@nzart.org.nz> or <zl3ov@nzart.org.nz> or post to 6 Boyd Street, Rangiora 7400, or phone (03) 313 7137.

Reminder

The next Section Leaders Nets should be 18 April and 16 May, 3900 kHz USB at 1930 hr unless notified otherwise.

Until next issue,

73, *Geoff ZL3QR & Bev ZL3OV*

Around the Branches

Christchurch Amateur Radio Club Br 05 and the quakes!!

Well – we survived the September shake reasonably well. The clubrooms were still useable a few days after. Unfortunately the latest one has compounded the damage so a bit more serious. However our damage pales into insignificance against others who have lost all. A very sad and sobering experience all round.

After the September quake, our main issues were the committee room on the end which was part of the original school buildings. This lifted and slewed on it's piles to come away from the main building and with a 200mm fall. Still useable but odd gaps. Also the car park was cracked but, again, useable. There were two wellheads we knew about but another popped out of the ground to make three! Two still working so we had water and when power came back on we were up and running again.

This time the issues are more serious! Carpark worse with some liquifaction. Will need to be temporarily filled to allow use before totally redoing later. The tower now has a distinct lean whereas before it was barely discernable. The main clubroom appears to have sunk (or the ground around has raised–depending on opinion!) down about 100-150mm which is the main issue. It still appears structurally intact which is great but drainage services are the worst issue. The committee room on the end is now worse and probably unusable. So we have a few issues to work through and try to get up and running ASAP. It is probably important to try and continue to keep some sense of normality in people's lives! No doubt there will be working bees aplenty although we are fully insured which is good. The issue will be actually getting the work done as there will be so much to do in Christchurch.

Other Christchurch quake news

Christchurch West Amateur Radio Club Inc Br56 suffered some minor cracks in its block walls from the September quake but fortunately no further serious damage from the latest shakes.

The September quake shook Malcolm Gordon ZL3UU's shack with gear falling to the floor. By contrast John Walker ZL3IB's semi-basement shack and workshop was quite shaken by the February quake with boxes and boxes of components etc ending up in an untidy heap on the floor. More serious, many of John's collection of vintage communication receivers also fell of their shelves but fortunately appeared to have suffered little external damage; however they still await testing.

Coming Up

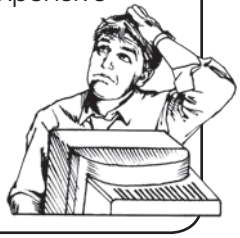
It is hoped to print the following articles in the next issue of *Break-in*:

– Knight's Point mini VHF DXpedition

– A simple stepper motor drive circuit

– A homemade 4:1 Balun; inexpensive but effective

Copy is needed urgently.
The cupboard is virtually empty!



Longer Wavelengths

Con Wassilieff ZL2AFP
<zl2afp@nzart.org.nz>

Software Defined Radio for VLF

In the last column I said I had hoped to report on my experiments in Software Defined Radio (SDR). Software defined radio reception is the bit where the demodulation, filtering, noise reduction etc is done by a computer rather than by the radio's hardware. Most software defined radios consist of a basic hardware front end which mixes the incoming RF signal with a local oscillator (LO). The LO has sine and cosine outputs to enable the unwanted image to be cancelled. The two mixer outputs produced are then sent to the two inputs of a PC soundcard where it is then subject to demodulation and further processing, including audio output if desired.

In my case, I avoid using a mixer as my current interest has been at the very low frequency end of the spectrum. I feed the output of my active antenna directly into the sound card where it undergoes processing by my SDR program. As far as I can tell, all SD radio programs (apart from my one) use conventional phasing method SSB receiving techniques, implemented as the software equivalent of hardware. There are some advantages in using this method but I have instead taken the cheap and easy approach and used a single high-resolution Fast Fourier Transform (FFT) to do the demodulation and display the spectrum. The FFT can be visualised as a lot of narrow bandwidth filters in parallel. This makes it very easy to do band-pass and band-reject filtering (by simply setting the unwanted filters (often called "bins") to zero. This is very easy to do in software, and results in "brick wall" filters. The remaining "bins" are then subjected to a reverse FFT to convert them back into audio.

Local oscillator tuning is accomplished by setting a particular bin (say the one representing 20 kHz) to be the 0 Hz bin. All bins above this zero-reference bin are in effect translated down in frequency by 20 kHz. This method avoids all of the messy filtering that is needed when using the phasing method of demodulation, as the filtering has already been done in the FFT. The FFT is calculated over 8192 samples at a sample rate of 96 kHz, resulting in almost 12 FFT's per second.

Adding functions such as a noise blanker, AM/FM demodulation, noise reduction etc, is pretty straight forward, as all of these functions consist of only a few lines of program source code. Figure 1 shows the appearance of my program. The bottom window displays the spectrogram from DC to 48 kHz; the upper window is an expanded 12kHz portion of the spectrogram in 4x resolution.

There are plenty of good SD radio programs out there that do an admirable job of demodulating audio from a soundcard. For example, in addition to "WRplus" mentioned in the Jan/Feb "Longer Wavelengths" column, there is a nice little program called "SAQrx" by Johan SM6LKM[1]. This is a "bare bones" panoramic receiver that was put together as a means of receiving the Swedish VLF station SAQ on 17.2 kHz. It is designed to work with conventional soundcards with a sample rate of 44.1 kHz, giving an upper frequency of 22.05 kHz. Johan has made the C source code for the program available so there is scope for further experimentation, for example to extend the sampling rate to 96kHz and hence receive signals up to 48 kHz.

What is a Fast Fourier Transform?

The FFT is a computationally efficient method of calculating the Discrete Fourier Transform (DFT). The DFT is a means of estimating the amount of a particular frequency present in a signal. The key step in this process is to break up the signal into individual (discrete) samples and perform mathematical operations on these samples.

If you multiply a sine wave (sample-by-sample) by another sine wave of exactly the same frequency, you end up with a new

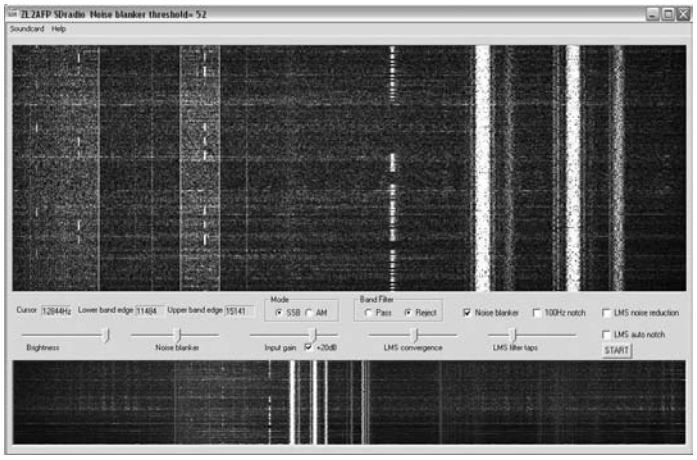


Figure 1. My first attempt at a software defined radio.

signal that consists entirely of positive components. If you then add up all of these components you end up with a positive number, which is related to the magnitude of the original sine wave. On the other hand, if you multiply a sine wave by another sine wave of slightly different frequency, you end up with a signal that consists of some positive and some negative components. If you add up all of these components you end up with the positive and negative components cancelling out each other resulting in a low or zero magnitude. Figure 2 shows this process graphically. The dotted lines are the original sine waves and the solid lines are the result of multiplying the two waves together.

In the DFT this process is repeated for as many test frequencies as required. The explanation above assumes that the signal is infinitely long and periodic so that there are as many positive as negative components in the multiplied result, otherwise the result will not be zero for the case where the signal frequency is not exactly equal to the testing frequency. An example in BASIC dialect may serve to give an idea of how this process works in a (slow) frequency analyser program.

The signal is sampled at the sampling rate (in this example "samplerate" = 256 samples per second) and the samples are held in an array (Signal) of 256 samples. The intermediate steps where the real and imaginary parts of the signal are calculated are held in arrays Real and Imag. The real and imaginary parts are just the sine and cosine components of each frequency component. Initially the real and imaginary arrays are all set to zero.

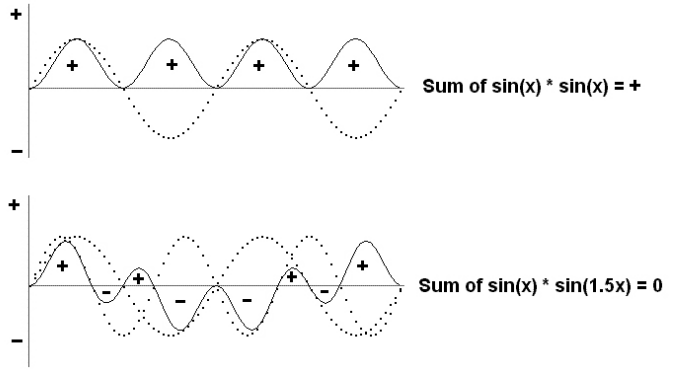


Figure 2. Multiplying sine waves together.

```
REM The DFT

FOR frequency = 0 TO 127        REM Check out each frequency from DC to 127Hz
  FOR sample = 0 TO 255         REM See how much of this frequency is present in the sample
      Real(frequency) = Real(frequency) + Signal(sample) * SIN(2*pi*sample* frequency/samplerate)
      Imag(frequency) = Imag(frequency) + Signal(sample) * COS(2*pi*sample* frequency/samplerate)
  NEXT sample
NEXT frequency

REM Note that we need to multiply the signal by both SIN and COS so that we can then find the magnitude
REM of the signal at each frequency by using:

FOR frequency = 0 TO 127
    Magnitude(frequency) = SQR(Real(frequency)^2 + Imag(frequency)^2)
NEXT frequency
```

Figure 3. Discrete Fourier Transform in BASIC.

A graphical plot of magnitude vs frequency can then be made to display the spectrum. It really is as simple as that. A lot of digital signal processing (DSP) appears daunting when approached mathematically but when the mathematics is translated into computer source code most of it becomes quite understandable.

600m activity

600m activity in ZL has recommenced after the December and January operational "summer break". Sky wave propagation does not start until after sunset and this occurs later than the normal 8.45pm start time for transmissions on 508.1 kHz by the Thursday evening experimenters. Participants in the Thursday evening net on 3666 kHz so far have included ZL1BCJ, ZL1QM, ZL2T (ZL2CA), ZL2AFP, ZL3EE (ZL3JE), and ZL4MD. The net currently runs fortnightly until NZ daylight saving time ends on Sunday 3 April after which nets will be held weekly.

Also in the last column I mentioned that Steve Olney VK2XV, the inventor of the incremental frequency keying (IFK) modulation technique, did not have the requisite Morse code proficiency required by the WIA for a scientific licence to operate on 600m. Since then a licence has been granted and he is now active on 600m with the call-sign of AX2NMR.

137 kHz activity

A two-way QSO between Joe VO1NA and Mike G3XDV using QRSS60 (ie 60 second dots) was conducted on 4 March 2011. This is the first transatlantic QSO for a couple of years.

The Swiss radio amateurs Vaudois Club station was granted permission to operate during February 2011 using two large ex-broadcast towers. The call-sign HE3OM was used during this period (since QRT on 4 March 2011). The two masts are 188m and 125m tall respectively. The 125m mast was used for transmissions in the 137 kHz LF band. Contacts were made with Jay W1VD.

Even longer wavelengths

The Indian station VTX3 can be heard occasionally on 18.2 kHz sending Morse code (audible day and night). This makes a nice change to the MSK stations that tend to populate this end of the spectrum. The spectrogram of VTX3 can be seen in figure 1.

"Dreamer's Band" (<10 kHz)

Things are really moving down at this end of the spectrum. Several amateurs are now transmitting on and around 8.7 kHz and a two way QSO on 23 January 2011 has been reported between Roland DL3NDR and Walter DJ2LF, albeit over a distance of only 4 km. The mode was DFCW300 ie. 300 second dot lengths! The contact took over three hours to complete. Gerhard OE3GHB, sending QRSS10, was copied by Lubos OK2BVG over a distance of 41 km.

Stefan DK7FC claims transmission (and reception via a "grabber" 40 km away) of a hand speed Morse code signal. The recorded audio of the received signal was clearly audible. A 40MB audio file is available as of the time of writing[2].

Other stations transmitting in the "Dreamer's Band" include Ossi, OE5ODL (received at 2800km); PA3CPM copied at 3 km; Chris G3XIZ copied at 45 km by Roger G3XBM; and many others.

Awhitu former NDB antenna

The farmer who now owns the mast has it and the hut plus land up for sale, so its days for amateur radio purposes may be limited.

Gordon ZL1KL remembers the Awhitu mast as one of five that were used as a navigational aid. This particular one probably came from then Radio Range station at Te Atatu, built near the end of WW2 by the US SeaBees. He says it was a system that used DF in reverse to lay down four beams that would guide aircraft to Whenuapai Airfield. Civil Aviation inherited this station at the end of the war but with the opening of Mangere International, Whenuapai became a purely military airfield and Te Atatu was downgraded.

International Marconi Day

The Cornish Radio Amateur Club notes that the 500 kHz band is part of the International Marconi Day event, to be held on Saturday 30 April 2011.

References

[1] <https://sites.google.com/site/sm6lkm/saqrx>

[2] <http://dl.dropbox.com/u/19882028/DK7FCinCWon8970Hzthe33kmband.WAV>

Old Timers' Club

Roy Simon ZL2KH
<zl2kh@xtra.co.nz>

Secretary/Treasurer:
Roy Symon, ZL2KH
Mail:
25 Annandale St,
New Plymouth
Phone:
06-758-2156
E-mail:
<zl2kh@xtra.co.nz>
Monday evening SSB net:
Net details: 2030 hr (local time) each Monday on 3.870 MHz LSB.

No new material has arrived in for the OTC page this month so its basically just some housekeeping notices this time around. There are some new members, some silent keys, a couple of certificates sent out, and a notice regarding the Annual General Meeting.

New members

There are four new members to welcome. They are:

- 1274, ZL3LIZ, Liz Buckland, Oxford
- 1275, ZL1TAJ, Neill Ellis, Tauranga
- 1276, ZL2RR, Barry Stewart, Wanganui
- 1277, ZL3VO, Jim Elder, Christchurch

We look forward to hearing some, or all, of them checking in on the Monday night net.

Silent Keys

Sadly, there are four Silent Keys to farewell this month. They are:

- 497, ZL1CZ, Tom Duxbury, Auckland
- 1051, ZL3PK, Lee Allan, Rangiora
- 653, ZL2AQI, Bert Cheyne, Palmerston North
- 559, ZL3IE, Len Hopkinson, Christchurch

As is usual, a sympathy card from OTC members was sent to all these families.

Certificates sent out

Two of our members celebrated 60 years on the air. Congratulations to both Gordon and Jim. As Gordon remarked "The ten years between me getting my 50 year certificate and my 60 year certificate have gone very fast".

60 Year certificates:

- 930, ZL1KL, Gordon Cooper, Tauranga
- 1277, ZL3VO, Jim Elder, Christchurch

Annual General Meeting

The Annual General Meeting of the Old Timers' Club (ZL) will be held on the Sunday morning of Queen's Birthday weekend (5 June 2011) at the NZART Conference in Upper Hutt. The business to be conducted will include the election of officers and other usual AGM matters. The recipient of the Montgomery Cup for the best article in *Break-In* by an OTC member in the preceding year will also be decided. If you are unable to attend and would like to nominate anyone please send your nomination to me. Nominations will need to be seconded – and the permission of the person being nominated will also be necessary.

There will also be time for the discussing of all sorts of matters that you might like to initiate.

Roy Symon ZL2KH
OTC Scribe

Next deadline for copy is **10 May**

WARO – nz womens amateur radio operators

with Lynette McDonald ZL1LL
<lynette.mcdonald@xtra.co.nz>

As I am preparing this column my thoughts are with the people of Christchurch with the unfolding results of the 22 February earthquake. It is not pleasant to watch on television and must be thousands of times worse to be living through it. The thoughts and prayers of the President, Executive and all WARO members are with you at this time.

I was unable to attend the Paengaroa sale this year because of another commitment but hope there was a good attendance again this year.

Notice of Annual General Meeting

The Annual General Meeting of WARO will be held at 8.30 am on Sunday 5 June at the conference venue at Silverstream. The agenda has been published in the latest bulletin.

I hope as many members as possible can attend this meeting. All YLs and XYLs are welcome to attend. XYLs can become associate members of WARO if they wish.

Nominations for Executive

Nominations forms should have been received by now but if there is an unfilled position nominations can be accepted at the AGM.

Thelma Souper Contest

The date for the Thelma Souper Contest this year is 2-3 April and I hope a number of YLs managed to come up this year. Numbers have been reducing over recent years and this is very disheartening for the Contest Manager and for those OMs who come up to support WARO.

Please get your logs in no later than 1 May 2011 to Bev Osborne ZL1OS, 34 Cobham Drive, Kawerau 3127, New Zealand. Logs can also be sent by email to <zl1os@slingshot.co.nz>.

WARO HF award

Contacts with ten different WARO members are required for this award. Contacts during the Thelma Souper contest count towards this award. Please email <lynnette.mcdonald@xtra.co.nz> to apply for the award.

Silverstream Conference

I am looking forward to meeting up with WARO members and XYLs at conference at Queen's Birthday Weekend.

33, *Lynnette ZL1LL*

Taranaki YL's morning Tea

On 20 February we held a morning tea at a local café for some of our Taranaki Lady Hams. It was so great to catch up with many of the old members from the past who we haven't seen for many years. Because of unavailability of technical help due to the death of their husbands, many have be forced to give up the hobby they once enjoyed, but still get a lot of pleasure out of meeting up with other women in what is predominantly a male domain.

We had such a great time catching up that we've decided we must make it a yearly event. Some bought along their OM's who put up with the constant chatter as we caught up on old times.

Field Day 2011

This year's Field Day was run at a local Egmont Village Primary School grounds under the shadow of Mt Taranaki/Egmont. We were lucky to have lots of helpers to get our tent up and set up our stations; four YLs helped out with this. During the contest both Jill ZL2DBO and Ngaire ZL2UJT participated and hopefully contributed to our score.

On the Saturday evening some of our other Branch members arrived to participate and joined us for a BBQ with their wives. Altogether we had a group of 27 people. Another YL Ann ZL2BOV, came along after being invited through the morning tea, plus another seven other YLs so this time we weren't outnumbered by males.

As we were close to Mt Taranaki and there was a southerly wind blowing, by evening everyone was rugged up in winter clothes that we hadn't worn for months, as it turned really cold. During the day the weather was very pleasant and it gave the ones that weren't operating a chance to talk coax cables, politics, and anything else that sprung to mind. We were all very aware that this exercise was very important for learning the skills we might need in an emergency especially since the Christchurch disaster showed how important we could be when communications are down. Our daughter is involved with Civil Defence in the South Island and was involved in previous Chrischurch quake and mentioned that amateur radio was the only form of communication available when all the phones went down, she was proud that we were involved with this interest.

We are fortunate that our President Frank ZL2BR is a Boy Scout leader, and everything in our camp had a place and ran very smoothly. Ngaire ZL2UJT even got a chance to make some pikelets for morning tea on a griddle set on a gas bottle, they were much appreciated by all. Two of our girls stayed overnight with their OMs and Ngaire ZL2UJT and Jill ZL2DBO both worked late into the evening until we nearly froze. Our aerial was strung over a massive pine tree at at least a hundred feet. Band conditions at the site were noisy with problems from high tension wires. What we did notice was a lack of other YLs on the air, nobody in our club worked a YL during the contest.

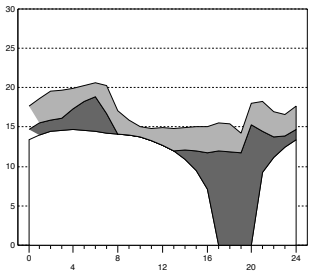
73, *Ngaire ZL2UJT*

Girls' Day Out; l>r; Ngaire ZL2UJT, Marie ZL2WMM, Ann ZL2BOV, Carol ZL2VQ, Wayne ZL2VN, Jill ZL2DBO, Ann ZL2UTR, Ingred ZL2ICE, Myrle ZL2MIC, Le-ann ZL2TLO, George (honorary member). Not shown Alastair ZL2BZN and Graeme ZL2APV.

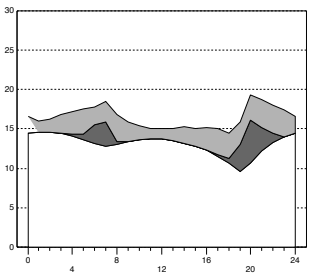
The Jock White Memorial Field Day team well represented by YL's ready to enjoy a BBQ.

Ionospheric Predictions

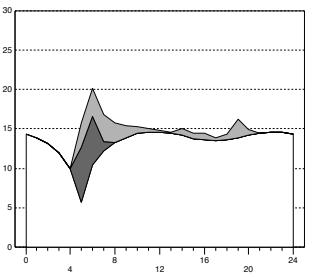
MAY / JUNE 2011 **T-index = 53**



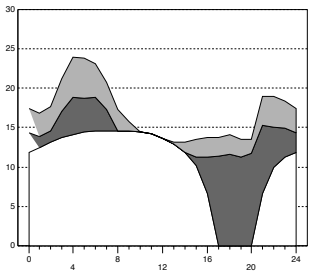
WN-Moscow (SP) 16548 km 312°



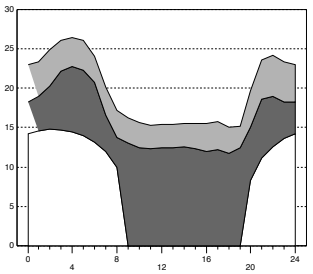
WN-London (SP) 18814 km 343°



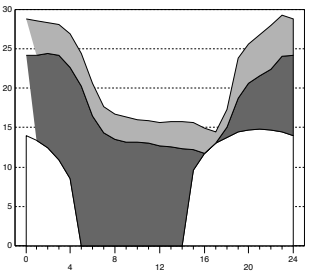
WN-Jo'burg (LP) 28265 km 31°



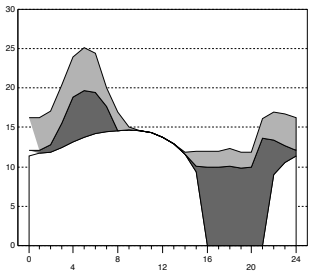
WN-Istanbul (SP) 17168 km 281°



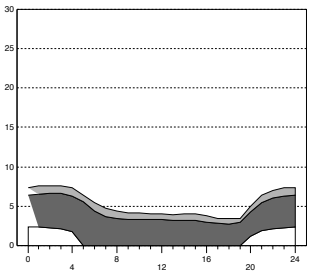
WN-Tokyo 9274 km 332°



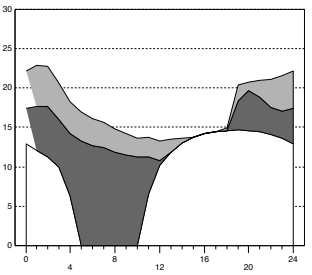
WN-San Francisco 10859 km 45°



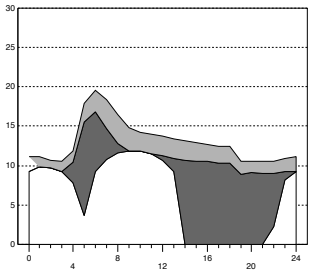
WN-Cairo 16519 km 261°



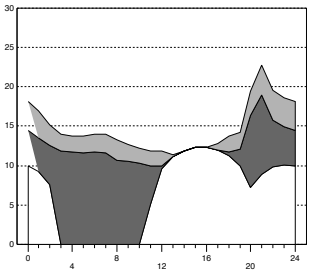
WN-New Zealand 300 km



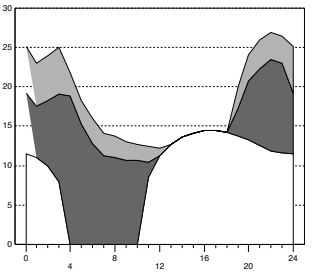
WN-New York 14402 km 66°



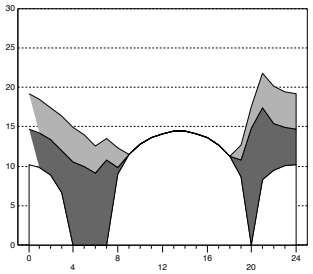
WN-Jo'burg (SP) 11759 km 211°



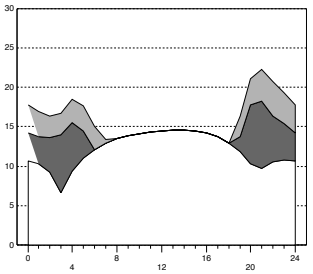
WN-Rio de Janeiro 11780 km 144°



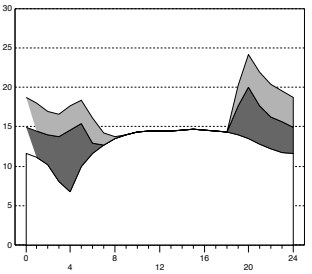
WN-Barbados 13962 km 104°



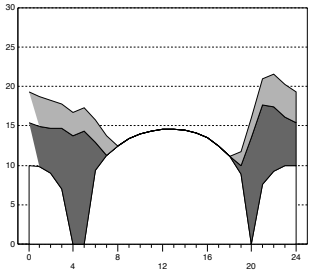
WN-Dakar 16862 km 155°



WN-Moscow (LP) 23476 km 132°



WN-Istanbul (LP) 22856 km 101°



WN-London (LP) 21210 km 163°

Horizontal axis shows time in UTC.

Vertical axis shows frequency.

Propagation is possible in the shaded areas, with best operation in the darker area.

These predictions are based on solar activity data supplied by IPS Radio and Space Services.

See pages 6–9, Break-In May/June 2004 "Choosing the Best Frequency" by the late John Gabites ZL2AQ for interpretation of forecasts and explanation of terms MUF, OWF and ALF.

HAMADS

Earthquake Delays – Please note that due to the earthquake in Christchurch there may have been a delay in receiving Hamads posted to PO Box 1733. Hamads which arrive after 10 March will be published in the next issue of Break-In.

WANTED – RADIO VALVES. Cash paid for old radio and TV valves. Prefer new in boxes. Ph (09) 575-6940 or E-mail <paul.ssegrub01@gmail.com>.

WANTED – Kenwood microphone suitable for Kenwood TS 520. (4pin). ZL2WZ. Ph (04) 589-2045 or Mobile (021) 236-4116 or E-mail <frankwade@clear.net.nz>.

Radio Electronics Group Inc

ANNUAL EQUIPMENT SALE

GLENVIEW CLUB INC.
211 Peacocks Road Glenview, Hamilton

SATURDAY 14 MAY 2011

Vendors: 8:30am Doors open 10am

$2 Lucky Ticket Entry

Trade display – Refreshments – Door prizes
Plenty of parking – Easy access

For vendor registration and enquires
Contact Trevor ZL4GJ (07) 8437 365 or
trev99@clear.net.nz, zl4gj@nzart.org.nz

TECSUN PL600 HF RECEIVER

LCD display • Direct frequency entry • SW (1711-29999KHz) • SSB • AM wide/narrow • DX/Local FM stereo (76-108MHz).
Includes:
• 10m longwire antenna • NiMh batteries and Australian approved
• Regulated charger, ear phones and carrycase.

EXPORT PRICE
A$189
including shipping

Av-Comm Pty Ltd
24/9 Powells Road,
Brookvale 2100, NSW
Australia
Ph +61-2-9939 4377
Fax: +612 9939 4375
michael@avcomm.com.au
www.avcomm.com.au

WANTED – Mains power tranformer, 2kV secondary or similar for linear project by school boy. Or part built linear for project for completion. ZL2IE. E-mail <s02560@rathkeale.school.nz>.

FOR SALE – 3 Element Beam, 10-15-20m. Dismantled. Includes approximately 10 metres RG213U Coax. Free delivery anywhere in Taranaki–$100. ZL2VI. Ph (06) 751-3052 or E-mail <zl2vi@clear.net.nz>.

FOR SALE – Valves; large assortment of transmitting type valves, both NOS and used stock (ex retired ham) includes 6DQ6, 6SJ6, 6146, 811a, 4CX250, etc. For list please send SAE to John ZL3IB, Ph (03) 348-9084 or E-mail <john.zl3ib@ihug.co.nz> or *Call-Book* Address.

FOR SALE – FT-897D, FP-30, FC30. All in ex cond with original boxes, manuals. Price neg on all or part. Enq ZL1BI. Ph (027) 439-3900 or E-mail <colin433@gmail.com>.

FOR SALE – Yaesu FT-60R VHF/UHF HT in original box c/w manual and charger plus extras–ADMS-1J programming software with 9 pin serial cable and adapter, E-DC-5B car cigarette lighter battery charger,CT-44 Mic adapter – $400 the lot including delivery in NZ. ZL3LSD. Ph (03) 358-9100 or E-mail <lorne.douglas@gmail.com> or *Call-Book* Address.

Answers to crossword on p 41
Across: (1) moon bouncers, (7) koru, (8) computer, (12) oral, (13) nicad, (15) aura, (17) loam, (18) leo, (20) lp, (21) SSB, (23) flairs, (25) WINZ, (26) card, (27) UHF, (29) ego, (30) chi, (31) sked, (32) pounce, (33) RCA, (34) od, (35) distress.
Down: (1) Makara, (2) neutralized, (3) oscilloscopes, (4) nominal, (5) emu, (6) speed, (9) transducers, (10) RD, (12) or, (14) impedance, (16) uplinked, (19) ER, (22) bifilar, (23) FW, (24) an, (28) HH.

Hamads and Classified Advertising in *Break-In*

Hamads up to 30 words are now free as a service to members but the following conditions will apply:

(1) Hamads. A single, free Hamad in each issue of *Break-In* is only available to financial members and Branches of NZART buying or selling personal equipment. Members and Branches wishing to use this service must include their NZART Membership Number or other evidence of membership. If possible they should use the official HAMAD form (on the reverse of their address sheet). If this is not convenient the advert may be emailed or sent typed double-spaced, but proof of current membership must be provided.

Each free Hamad is limited to 30 words; any extra words will be charged at the current rate of 25c per word, telephone and fax numbers count as two words each, e-mail addresses and *Call Book* address as three words each. All prices include GST. Free Hamads will also be accepted for sales of deceased estates where the member was a financial member of NZART during the past 12 months and from branches who are financial members of NZART (ie have a Membership No).

Advertisements are accepted in good faith from amateurs and may only be used be the sale of used radio and allied equipment. The Association, or its representatives, can take no responsibility for them nor take part in any discussion resulting from sales or purchases; remember "Caveat emptor". In case of dispute, the Editor's decision is final.

Trade or business adverts, even from members, will not be accepted here, since this is a subsidised service to members.

(2) Classified Advertisements are available to members, non-members and commercial firms offering products or services for sale, etc. All adverts not meeting the Hamad criteria will be considered to be Classified Advertisements.

Classified Advertisements will be charged at 40c per word. Bold type is available at 50c per word. For semi-display (ie rule above and below) add $5.00. All Classified Advertisements must be pre-paid, receipts will not be given. All prices include GST.

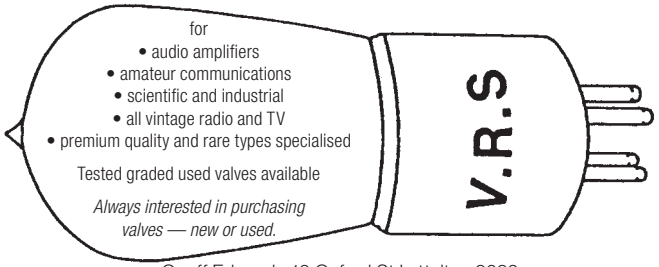
(3) Display style adverts will be still be charged for at the current rates.

(4) Closing date. Please send Hamads and Classified Advertisements to The Advertising Manager, PO Box 1733, Christchurch, to be received no later than the 10th of the month prior to publication. Please make cheques payable to NZART; no cash or credit cards. The Editor and NZART Inc reserve the right to discontinue or decline any advertisement.

For further information and commercial advertising rates, please contact:
Lorne Douglas ZL2AHB, Advertising Manager, c/- PO Box 1733, Christchurch. Telephone (03) 358-9100. E-mail: <hamads@nzart.org.nz>.

VALVE RADIO SPARES

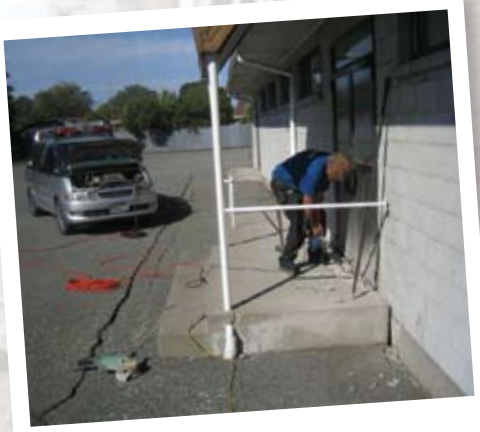
Importers and stockists of quality valves of all types and related items


for
• audio amplifiers
• amateur communications
• scientific and industrial
• all vintage radio and TV
• premium quality and rare types specialised
Tested graded used valves available
Always interested in purchasing valves — new or used.
V.R.S

Geoff Edwards 12 Oxford St Lyttelton 8082
ph 0274 338452 or 03 3289208 fax 03 3289207 email tubehead@xtra.co.nz

Index to Advertisers

AvComm Pty Ltd p52
ComCentre . . . . . inside front cover
DX without TX p38
ICOM NZ Ltd . . . . . outside back cover
Glenview Club Annual Equipment Sale p52
Valve Radio Spares p52



The entrance to the BrO5 clubrooms was blocked.

The BrO5 carpark was badly damaged.

The "Leaning Tower of BrO5".

Malcolm Gordon ZL3UU's Halswell shack suffered in the September quake.

Kelvin ZL3KB's WS48 set.

John Walker ZL3IB's shack was a shambles.

John Walker ZL3IB's basement workshop and hamshack: components and radios all over the floor.

ICOM

HF/VHF/UHF TRANSCEIVER

IC-9100

1200MHz
430/440MHz
144MHz
HF/50MHz
Satellite
D-STAR
GPS

INSTORE NOW!

THE ALL-ROUND TRANSCEIVER

ICOM New Zealand

SHOWROOM HOURS: 9am — 5pm MONDAY TO FRIDAY
THE PROFESSIONALS IN COMMUNICATION EQUIPMENT
— MAIL ORDER A PLEASURE —
VISA OR BANKCARD ACCEPTED

DIGITAL

SOLE NEW ZEALAND DISTRIBUTORS
146A Harris Road
East Tamaki, Auckland
PO Box 14-574, Auckland
Telephone (09) 274-4062
Fax (09) 274-4708
Email: inquiries@icom.co.nz
Website http://www.icom.co.nz